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PROCEEDINGS.

NINTH MEETING, Thursday, May 5th, 1859.
Archibald Russell, Esq., 2d Vice President, in the chair.

The following gentlemen were elected resident members of the Society: John Sherwood, Charles A. Joy, Philip Lydig, Jr., Smith Clift, Edwin J. Brown, T. B. Stirling, C. M. Bovie, and Samuel Woodward.

Mr. Jay, Foreign Corresponding Secretary, read a letter from His Excellency, Christian S. M. Olrik, Royal Inspector of North Greenland, (dated Copenhagen, 15 Jan., 1859,) thanking the Society for the honor conferred by his election as a Corresponding Member, and enclosing two papers—one, "*A Meteorological Journal kept at Godhavn, N. G., from 1st January until the 20th September, 1858, by C. S. M. Olrik,*" and the other an "*Extract from the Meteorological Journal of Lady Franklin's Arctic Searching Yacht Fox, for Feb., March and April, 1858, (by Capt. McClintock, R. N.,)*" referring to observations in the same latitudes as Godhavn, when drifting in the ice of Davis' Straits.

The Foreign Corresponding Secretary also read two letters, (dated 14th and 25th February, 1859,) from Gideon Nye, Esq., U. S. Consul at Macao, relative to recent events in China, and covering several printed papers on the same topics.

Mr. Jay, as chairman of the Agricultural Section, read the first part of a paper on the

"*Imported Live-Stock of the United States,*" prepared by Col. Lewis G. Morris, of Mount Fordham, Westchester Co., N. Y., chiefly referring to horses; and also a letter from the author, stating that the second part of the paper (referring to horned cattle, sheep and swine) would be presented at the next meeting.

The chairman of the Agricultural Section also read a paper on "*Vine-Culture in Missouri,*" by Fred. Munch, Esq.

The reading of the paper was followed by a conversation, in which Mr. Russell stated that Mr. Munch had published a volume on this and other interests of the West, and had recently returned to Germany for the purpose of inducing his countrymen to emigrate largely to the State of Missouri, and engage in the cultivation of the grape, and the manufacture of wine.

On motion, the thanks of the Society were voted to Messrs. Olrik, Nye, Morris and Munch, and their several communications were ordered to be deposited in the Archives of the Society.

The Recording Secretary read several letters on the current business of the Society, among which was one from the Spanish Government, notifying the Society of the grant made to its Library, of a copy of the recent census of Spain; and one from the University of Christiania, with a list of publications transmitted to the Society.

Adjourned.

DEPARTMENT OF GEOGRAPHY.

THE ISTHMUS OF TEHUANTEPEC.—ITS INHABITANTS AND RESOURCES.*

GENTLEMEN OF THE GEOGRAPHICAL SOCIETY:

A glance at the map of the Western Hemisphere naturally suggests that the narrow strip of land which forms the connecting link between the two Americas, should furnish the greatest facilities for the opening of a communication from the Atlantic to the Pacific.

The project of such a communication has been the object of scientific investigation ever since the re-discovery and settlement of America, and attracted, as we all know, in a special manner, the attention of the navigators and geographers of Spain, from the period that the Spanish American colonies formed an integral portion of the Kingdom. The history of these attempts to open a route across the Isthmus of Tehuantepec is full of interest, not because as isolated items, they are new to the members of this learned society, but because they present a series of consecutive facts and circumstances which it is important to remember in an investigation like this.

In the conquest of the Mexican Empire, Hernando Cortez foresaw with that unerring accuracy of judgment which formed his chief characteristic, the realization of the broken dreams of Columbus, and the establishment of a commercial junction between the seas. It was under these circumstances that he devised the naval expedition of Christoval de Olid to the coast of Honduras, and the land reconnaissance under Sandoval, who crossed the Isthmus of Tehuantepec diagonally to Guatemala. We are all familiar with his memorable letter to the Emperor, in which he says, "Your Majesty may be assured that as I know how much you have at heart the discovery of this great secret of a strait, I shall postpone all interests and projects of my own, some of them of the

"highest moment, for the fulfilment of this great object."

Subsequent explorations demonstrated to him that the twin continents were inseparably united, and this long sought-for strait was only, after all, a chimera in the minds of those who knew nothing of the physical geography of the sea. Undeterred by this fact, he prosecuted his labors unceasingly. The expedition of Diego de Ordaz to the river Coatzacoalcas, and that of Luis Marin through its eastern tributaries to Chiapas, together with his own disastrous one through the province to the shores of the Caribbean Sea, had demonstrated the feasibility of an overland communication across the Isthmus of Tehuantepec. This knowledge, combined with the loving influences of Malinche, made Cortez turn his eyes away from the scenes of his glorious triumphs in the valley of Mexico, to locate the gift lands of his Emperor within sight of the province where that heroic woman was born; and then, as if to identify his name forever with the project, he chose for his title of nobility, the name of the principality through which the road should pass. From that hour till his death, Cortez cherished the hope of seeing it permanently established. Don Lucas Alaman, the ablest of modern Mexican historians, has left in the archives of the Mexican Congress, an elaborate account of the efforts which were made by the Conqueror to develop the agricultural resources of his estates in the valley of Oaxaca, by the introduction of slaves, implements, and cattle, while the writers of his day tell us how Cortez labored in "his own port of Tehuantepec" to establish the commercial intercourse which was essential to the maintenance of the Isthmian transit between the Gulf of Mexico and the Pacific. In this connection I may mention that the immense island of Tacamichapa, which is encircled by the diverging branches of the Coatzacoalcas, the Apolozonga and the Mistan was given by the Emperor Charles V to Malinche, in consideration of the invaluable services rendered by her to the conqueror. To this day in her native village, (once called Painalla, but now known

* An Address delivered before the "American Geographical and Statistical Society," on the 14th April, 1859, by John McLeod Murphy, Esq., C. E.

as Ialtipan,) the Indians lay claim to the tract, and say that Cortez located it for her on an island that its boundaries might never be disputed.

With the death of Cortez, the project sunk into comparative oblivion. Towards the close of the 17th century Dampier made an exploration of the Coatzacoalcos and constructed a chart of the bar, the soundings on which are the same as those of to-day.

In the year 1745, the idea of opening the Tehuantepec route was again revived by some enlightened men in Oaxaca, who presented a memorial to the Viceroy of Mexico, setting forth the immense advantages that would arise to the Kingdom by making the Coatzacoalcos a port of entry. This document which contained a topographical description of the Isthmus, and a minute hydrographical discussion of the various ports on the Pacific, displayed an intelligence and foresight scarcely to be expected in days so dark and overshadowing to intellectual culture as those. The merchants of Vera Cruz no sooner heard of this memorial, than they adopted the most extraordinary means to prevent its reaching Madrid. At Cadiz, the Philippine Company exerted a powerful influence at Court, against the Isthmus route; and in a lengthened appeal to the Crown they set forth the commercial calamities that threatened to ensue. In this tirade they were joined by the traders at Acapulco, and the result was an order from the Court, denouncing the projectors as "Audacious innovators of the established regulations and commerce of the Kingdom," and prohibiting them ever again reviving the subject under pain of the royal displeasure. But the most interesting document which has been handed down to us, is from the pen of Don Augustin Cramer, who was an engineer by profession, and who made, by order of the Viceroy Don Antonio Maria Bucauli, an examination of the entire route. This was performed in 1774, and embraced a plan for a small canal by confining the waters of the rivers which traverse the Isthmus in an east and west direction, and then opening a dyke through the

table lands to the Chicapa. The topographical descriptions given by Cramer are of admirable exactness, and his work shows an intimate knowledge of engineering. These results, although communicated to the Spanish government, attracted no notice whatever. Later and when it might be supposed that such unnatural and impolitic restrictions would be beneath the dignity of Spain, the Viceroy Revillagigedo and Iturregaray urged the plan of a ship canal to unite the waters of the Coatzacoalcos on the north, with those of the Chicapa on the south, but the application was treated with contempt, and both incurred the rebukes of the haughty cabinet at Madrid.

The next writer upon this subject was Baron Humboldt, but as he never visited the Isthmus his identity with the project is rather that of a learned and powerful advocate, than an actual explorer of the region through which it was designed to pass. On the 30th of April, 1814, a decree of the Spanish Cortes was issued authorizing the opening of this canal. But the subsequent declaration of Mexican Independence, and the engrossing political distractions which followed, left that government wholly unable to turn its attention to the realization of so gigantic a scheme.

In 1820 William Davis Robinson, an American citizen, published a valuable memoir of the Mexican Revolution, in which he bore a conspicuous part as a soldier under General Mina. This work contains an interesting account of the various inter-oceanic routes; and as the writer spent a considerable time on the Isthmus of Tehuantepec, his views drawn as they were from actual observation, are extremely accurate, and embrace a valuable computation of the distances between Tehuantepec and the route to China.

We thus see in the comparatively early days of this project, the association of an American name with its proposed development.

In 1824 a commission was appointed jointly by the State of Vera Cruz and the Federal Government, to survey the Isthmus. This consisted of Don Tadeo de Ortiz and Colonel Don

Juan de Orbegozo. The former was directed to examine the country with reference to a system of colonization, and the latter to make an engineering report on the feasibility of a carriage road. It will be time enough, however, to speak of these results hereafter.

In 1830 an extensive scheme for colonizing the Isthmus, ostensibly in view of an immediate opening of the route, but in reality to convey into exile a body of men who had participated in the revolution, was projected in France, under the auspices of Laine de Villivegne, who fitted out an expedition consisting of five small vessels, named the *Petit Eugene*, the *Glaneuse*, the *America*, the *Diana*, and the *Hercules*. These left Havre within a few days of each other, in the latter part of November of that year, and reached the mouth of the Coatzacoalcos after a boisterous passage of 69 days. On attempting to cross the bar, three of the vessels were wrecked; and although no lives were lost, it is impossible to describe the sufferings which the poor emigrants were compelled to endure. On reaching Minatitlan, the custom house officials seized the inadequate supplies saved from the wrecks for non-payment of duties; and the colonists, who were principally mechanics, musicians, and professional men, found, to their dismay, that the lands intended for their settlement were only the low, inundated marshes along the shores of the Coatzacoalcos. The magnificent plantation of Mons. Giordan, the consignee and agent, (of which so much had been said before leaving France,) consisted of a small wooden house and a garden of about ten yards square, in which were planted a few pine apples. One of the emigrants, Matthieu de Fossey, thus fills up the details of this melancholy picture: "When the calamities of the settlers reached the culminating point, they scattered in every direction over the republic. Those who had settled on the borders of the Sarabia went to Guichicore, Tehuantepec and Oaxaca, where they applied themselves to different occupations; others journeyed overland to Vera Cruz, and re-embarked for France; others again remained at

Minatitlan, which soon became converted into an hospital, destitute alike of medicines and nurses. In all the houses were to be seen the dying abandoned, and the convalescent unable to escape. In the broad, sweeping strokes of his scythe, the blind harvester death, left women and orphans without protectors; some mothers, in their maternal tenderness, found sufficient strength to contend against these distressing evils; many of the children were taken care of by the Indians and the rich creoles; others took situations as servants; and a number of young women, carried away by despair, gave themselves up to shameful lives of prostitution. Unfortunate and unhappy as were the consequences of this emigration scheme, it is plain to be seen that it was undertaken without any regard to the well-being of the colonists, or what is perhaps more deplorable, without the slightest knowledge, on their part, of the country, its laws, or its inhabitants. It suffices to say that scarcely a vestige now remains of this colony, which consisted of 300 souls.

With the exception of what was done by Hernando Cortez, in the construction of a military road from Tehuantepec to the navigable waters of the Coatzacoalcos, and thence by sea to Vera Cruz and the Havana, nothing of a practical character was ever attempted. This road continued to be used for upwards of a hundred years, but, owing to the hydrographical changes which occurred at the entrance of the Lagunas, (the Pacific terminus of the route,) the port was superceded, and a new route was opened from the City of Mexico to Acapulco. Gradually the spirit of monopoly which pervaded every commercial institution in Spain, limited the intercourse of trade to a single port in each sea, viz.: Acapulco on the Pacific, and Vera Cruz on the Gulf of Mexico, and thus the passage of Tehuantepec passed into disuse. However, in 1798 it was re-opened, to convey the indigo from Guatemala to Vera Cruz. But with this exception, as we have seen, no *bona fide* steps were taken by the Mexican people, either as colonists of Spain or as an indepen-

dent nation for a period of more than 300 years.

In noticing these historical memoranda of the various attempts to open a transit route across the Isthmus of Tehuantepec, we are forcibly struck with the high character of the men who explored it, and urged its construction. It is evident, nevertheless, that the failure to accomplish anything arose from no want of knowledge of the practicability of the project, but that it was stifled amid the jealousies which have forever cursed the commercial enterprise of Spain.

Finally, in 1842, a grant was made by Santa Anna to Don Jose de Garay, an enterprising Mexican citizen, through whom the franchise passed, after various modifications and diplomatic vicissitudes, into the hands of American capitalists. To the engineers under the auspices of Mr. Garay, we owe much of our present knowledge of the local geography of the Isthmus. The chief object of this commission was to ascertain the practicability of a ship canal, but, unfortunately for the undertaking, the enormity of the capital required for its construction kept the project in abeyance, until the science of engineering pronounced against the folly of *all* inter-oceanic communications by water.

On the death of Don Jose de Garay, the commercial world was deprived of one of its most valuable and comprehensive intellects, and in him humanity lost a benefactor. It is sad to think that it was not accorded to him to witness here the consummation of his darling project; but perhaps it was because he was called to observe, from a higher point of view, the humanizing influences which he dreamed would come to pass.

It is not a little singular, that after a lapse of three centuries, a corps of American engineers should be able to trace on the Isthmus, as the most feasible line for a railway between the Atlantic and Pacific Oceans, the very road which the conqueror of Mexico caused to be made. Indeed, I may say that, from the plains of Sarabia to the city of Tehuantepec, a dis-

tance of seventy-seven miles, the alignment is almost identical.

But let us glance now at the geographical position of the Isthmus, which lies within the territorial limits of the eastern sections of the States of Oaxaca and Vera Cruz. It is the narrowest portion of the Mexican Republic, that is washed by the two great seas, and is comprehended between the parallels of $16^{\circ} 6'$ and $18^{\circ} 10'$ north latitude. Although the coast line on the Mexican Gulf tends almost due east and west for a considerable distance, the boundaries of the Isthmus proper are marked on the east by the entrance to the Laguna of Santa Anna, and on the west by the majestic peaks of Pelon and San Martin. On the Pacific side, which is the portion within the intendency of Oaxaca, the Department of Tehuantepec stretches eastwardly to the limits of Tlacolula. These somewhat irregular boundaries comprise an area of very nearly 10,350 square miles, being somewhat grater in extent than the State of Vermont.

The geographical position of the Isthmus of Tehuantepec can be perceived at a glance. But what shall we say of the tremendous revolution that is destined to take place in the commerce between Europe and the west, when this connection between the two oceans is permanently established?

Doubling the stormy cape will then be unknown, and voyages around the world will be changed to "trips" across. The American continent will then become the entrepot for the commerce of the universe, and the United States the "Mistress of the Seas."

Enough has been said to demonstrate to the satisfaction of every intelligent mind, the immense advantages which arise from the geographical position of the Tehuantepec route. In a military point of view it is of all the routes proposed, the true American one. It is the route which is entirely commanded by our possessions on the Gulf of Mexico, and not domineered over by any British possession whatever. We are therefore better prepared to defend, occupy, and keep the Isthmus of Tehuantepec, than

any other position on this side of our continent south of New Orleans.

As a project it is the only one which holds out a hope for our fallen and prostrate sister Republic. The mining interests of Mexico have long since perished, and her commerce is dead beyond the hope of human resurrection.

The true policy of our government upon this important subject is too plain to need comment from me. The Isthmus of Tehuantepec is the great artery through which the life blood must flow to the palpitating heart of the Mexican nation.

Through the efforts of the Louisiana Tehuantepec Company, the route was formally opened on the first of November last, and since then the mails have been successfully carried between New Orleans and San Francisco in fifteen days.

The transit is made in light draft steamers for ninety miles to the navigable head-waters of the Coatzacoalcos, where it connects with the land conveyances and passes through a country of hill and dale and plain unequalled in the world for salubrity of climate and richness of scenery. This distance of 116 miles over a well constructed carriage road, brings the voyager to the shores of the broad Pacific. At Ventosa the present terminus, he is conveyed on board of the mail steamer, and in a week he is landed in San Francisco.

As respects the topography of the Isthmus, I trust that I may be pardoned the liberty of extracting from the published account of the survey of Major Barnard the topographical description which I had the honor to contribute to that work more than eight years ago.

In considering the Isthmus with reference to its general topographical features, it may properly be said to comprise three main divisions, more or less distinct in topography, climate, inhabitants and productions; the first, embracing that portion extending from the Gulf to the base of the Cordillera, and which may be called the Atlantic plains; the second comprising the more elevated or mountainous districts in the central parts; and the third, including the

level country bordering the ocean on the south and known as the Pacific plains.

The first division comprises a belt of country of some forty or fifty miles in breadth, lying contiguous to the Gulf coast, and made up of extensive alluvial basins of exceeding richness and fertility, through which the drainage of the northern slope of the Cordillera discharges itself into the Gulf.

The principal of these hydrographic basins is that of the Coatzacoalcos, which occupies the central portion of this division, and has a general direction of N. N. E. by S. S. W.

Conspicuous to the west of the Coatzacoalcos are the peaks of San Martin and Pelon, which constitute the most striking topographical features of this division of the Isthmus. The former of these peaks was so called because San Martino, a soldier of the expedition, first described it from the deck of Cortez's vessel, and the latter obtained the name of Pelon or the "Bald Mountain" from the Indian fishermen on the coast. These mountains terminate a long chain of hills extending to the west, known as the Tuxtla Range, between which and the Jaltepec River on south, the only highlands are the Encantada mountain, five miles to the west of the Coatzacoalcos, and thirty miles from the Gulf; Mount Tecuanapa, thirty seven miles eastward of this, surrounded by extensive plains; and the cerros of San Vincent and Acalapa which lie west of the Tonalá.

With the few exceptions here referred to, the entire country embraced in the northern division, presents the appearance of a broad plain entirely covered with dense forests.

The second or middle division may be said to extend from the Jaltepec River on the north to within twenty-five miles of the Pacific, comprising a strip of country through the central portions of the Isthmus, of some forty miles in breadth on the west, and gradually widening out towards the east, to sixty or seventy miles. This division presents a great diversity of feature. The immense chain of the Cordillera, which, under different denominations, extends almost without interruption, the entire length

of the two Americas, traverses the country from east to west; but instead of those lofty volcanic peaks which constitute so striking a feature of extensive portions of this gigantic chain of mountains, there is a sudden depression of the range in its passage across the Isthmus, the continuity of the chain being nearly broken at a point directly in the line of shortest communication between the two oceans.

The elevated spurs and ridges which traverse the country generally in an east and west direction, offer the principal obstacles to the constructions of a railroad across this portion of the Isthmus.

Further to the south are the hills of Xochiapa, which originally seemed to have formed a connected chain, joining the mountain range to the east and west, but have been cut through or divided by the Malatengo, Almoleya, and Chichihua Rivers; thus opening natural passages through a range of hills, which otherwise would seem to have offered an almost insuperable obstacle.

Between this range and the summit pass, the country is made up of elevated rolling plains, which are divided by low ranges of hills into three divisions, known respectively as the plains of Xochiapa, Chivela, and Tarifa. They gradually become more elevated as we approach the summit pass, and also present a more uniform surface. They are bounded on the south by cerros which terminate in rugged limestone peaks, at an elevation of from 1500 to 2000 feet above the Pacific; and form the only connecting links between the high mountain chain of Oaxaca, and the cordillera of Guatemala.

By a narrow opening or gap in these mountains, we descend suddenly from the elevated table-lands to the Pacific plains, which form the third or southern division.

These plains average about twenty miles in breadth, from the base of the mountains to the Pacific coast, and descend at an inclination varying from ten to fifteen feet in the mile, thus forming, as it were, an immense inclined plane, with its side next the mountains, about two hundred and fifty feet above the Pacific. Under

these circumstances they present a gentle slope towards the sea.

The plains were traversed by eight rivers which discharge the drainage of the southern slope into the Pacific.

The most important of the streams are the Ostula and Chicapa on the east, and the Tehuantepec on the west. The first two named rivers have their source in the highest parts of the Sierra to the east of San Miguel Chimalapa. It is said of them that they always rise and fall simultaneously, the slightest change in one stream being accompanied by a corresponding variation in the other, a fact which has originated the belief that they have a common source in a lake supposed to be on the summit of the mountains to the east; though the true reason is no doubt to be found in the fact that they both proceed from the highest points of the Sierra, and through the upper part of their course are in close proximity to each other.

The lagoons which receive most of the drainage of the southern slope extend a distance of nearly forty miles along the coast, and comprise an area of more than two hundred square miles; they are divided by a narrow peninsula of land into two principal divisions, known as the upper and lower lagoons. Though of considerable extent, they are generally shallow, and no doubt annually becoming more so from the sediment brought down by the numerous rivers which discharge into them.

The Bay of Ventosa is formed by an indentation in the coast, and the projection of the Cerro Moro on the west. The Tehuantepec River discharges itself near this point. The bay is partially sheltered from the north winds by low ranges of hills from seven to nine miles distant. A short distance to the westward is a deep indentation of the coast known as Salina Cruz. This, no doubt, will become the terminus of the Tehuantepec route, on the Pacific, not only by reason of its being better sheltered, but because the easterly currents are deflected by the Moro Point which forms the only claim of Ventosa to a harbor. The anchorage is good,

and the shores are bold and deep. Of the streams watering the northern slope of the Isthmus, the most important by far is the Coatzacoalcos, which serves not only for the drainage of a large extent of country, but also furnishes the natural channel through which the projected communication between the two oceans is in part effected. It has for its tributaries on the east the Chimalapella, Pirial, Chalchyapa, Churriagas, Coachapa, Uspanapa, and San Antonio Rivers, and on the west there falls into the Coatzacoalcos, the Milago, Malatengo, Almoloya, Sarabia, Junnapa and Jaltepec, together with innumerable streams of lesser import.

The Jaltepec River has its source in the Sierra of the Mijes, situated in the district of Villa Alta, and is navigable for light draft steamers all the year round, to a spot forty-five miles from its mouth. This river is nearly as large as the Coatzacoalcos above the confluence of the two streams, and is the most important tributary on the west. The general course of the Coatzacoalcos, from the confluence of the Malatengo to that of the Junnapa, is from south to north; it then runs north-west until it meets the Jaltepec, and thence to the bar its general course is north-east.

At the Horqueta, as has been said, the river branches—the western arm being called the Brazo Mistan, and the eastern, the Brazo Apotzongo; these branches unite after having formed the circuit of the island of Tacamichapa; seven miles below this point, the Coatzacoalcos receives the waters of the Coachapa River on the east. The source of the stream is unknown, but it has been ascended in canoes for twelve days—the time usually occupied in going from the bar of the Coatzacoalcos to the pass of Sarabia. Schooners have also sailed up it for a distance of several miles. The cross ties used on the railroad at Vera Cruz were manufactured from timber obtained from the banks of this stream.

Four miles below the debouché of the Coachapa, but on the opposite shore, is the village of Minatitlan, and three miles below this, the

river Uspanapa joins the Coatzacoalcos by its right bank.

The Uspanapa is the most considerable of all the numerous tributaries of the Coatzacoalcos, and is, in some respects, even superior to the latter stream for purposes of navigation—carrying a sufficient depth of water to float large vessels to a greater distance from the Gulf, and also being less tortuous. In 1851 I explored it for a distance of 45 miles, but its source has never been reached.

Below the Uspanapa, near a spot named Paso-Nuevo, through which runs the high road leading to Tobasco, the river San Antonio joins the Coatzacoalcos, proceeding from some marshes nineteen miles above its mouth; and one mile lower down, on the opposite bank, it receives the waters of the Tacoteno River.

The banks of the river below Minatitlan are very low, and frequently flooded. The mouth of the Coatzacoalcos, the geographical position of which is $18^{\circ} 8' 20''$ N. lat., and $94^{\circ} 32' 50''$ long. west from Greenwich, is 115 miles west from the river Grijalva or Tobasco, and about 110 miles from Vera Cruz. Its width is about 1,500 feet, and its depth varies in different places. A transversal section of the river, over the bar, shows it to be slightly swelled in the middle, and hollowed out towards the two banks of the river; the hollow and the right forming the eastern, and the other the western pass.

As soon as the bar is crossed, and the ascent of the river commenced, it widens and deepens, and at seven miles from the Gulf, the lead shows a depth of 40 feet, which is preserved for some distance. The least depth in the channel below Minatitlan is twelve feet, and this may be carried nearly to the island of Tacamichapa. The superior advantages offered by this stream as a safe and convenient harbor for ships, early attracted the attention of the Spanish conquerors. Cortez, in his official dispatches to the Emperor Charles V, speaks of the importance of this river, as furnishing the best harbor to be found on the Gulf coast of Mexico. In giving the results of a survey of

the river, made by his order, he says: "They found two fathoms and a half of water at its entrance, in the shallowest part; and ascending twelve leagues, the least they found was five or six fathoms."

These soundings were made in the year 1520, and give about the same depth over the bar at the mouth of the river which we now find.

Thus in brief, we have a topographical view of the country through which, in 1851, Major Barnard, one of the most distinguished members of the corps of the U. S. Engineers, traced the line of the Tehuantepec Railway; and step by step we have been enabled to follow the project, until its final surrender into the hands of our own citizens; among whom none deserves a higher meed of praise for his perseverance and patriotism than Mr. P. A. Hargous, of this city.

But let us look again at the Isthmus, and while we note its productions, make the acquaintance of the people who inhabit its dense forests, its rolling table lands, and its cultivated plains.

I have already said that this portion of the Mexican Republic may be divided into three distinct parts, and that these parts differ from each other in all the essential respects of topography, climate, inhabitants, and productions.

The Atlantic plains present a broad belt of rich, alluvial country, covered with a reeking mass of vegetation. The lands are incomparably rich, the climate is close and humid, and the population sparsely scattered amid the densely wooded tracts of country. This is the real region of the pine-apple and the palm. The hundred varieties of the latter tower gracefully above plants of the most impenetrable foliage, whose overhanging chumps of verdure sweep the current at every sinuosity. But if the family of palmæ be large, the diversity of its useful purposes is not less so. One kind yields substitutes for bread and yeast; another, sugar and wine; a third, oil and vinegar; a fourth, milk and wax; a fifth, resin and fruit;

a sixth, medicines and utensils; a seventh, weapons and cordage; an eighth, paper and clothing; and a ninth, habitations and furniture. Here also grows spontaneously the *bromelia pita*, which flourishes alike indifferent to soil, climate and season. From it is fabricated thread and cordage mats, bagging and clothing, and the hammocks in which the natives are born, repose and die. The fibres of the *pita* are sometimes employed in the manufacture of paper; its juice is used as a caustic for wounds, and its thorns serve the poor Indians for needles and pins. Throughout all the forests which skirt the tributary streams, the *india rubber* tree is found in astonishing numbers; and in equal abundance grows also the vanilla, the sarsaparilla, and the liquorice root. On the plains east of the river Coatzacoalcos, rice, cotton, sugar cane, and allspice are raised, wherever cultivated, in considerable quantities. Among the staple products of this region is the coffee tree and the three broma cacas. Everywhere on the *milpas* two crops of maize are annually obtained, and it is no uncommon thing to find the reaper and the sower engaged in the same field. But the most lucrative source of trade already opened on the northern division of the Isthmus, is the cutting and shipment of mahogany. This valuable wood owes its introduction to the mechanic arts to Cortez and his companions, who employed it in the construction of the ships which they built for prosecuting their voyages of discovery. It is a curious fact, that while England is the greatest consumer of mahogany to day, it was not used there until the year 1724, when the Duchess of Buckingham had a bureau made out of some random planks which were sent as a present to her family physician. It is needless to say that her ladyship regarded the article as a luxury, and the cabinet maker realized a fortune. During the last year, the shipments of mahogany from Minatitlan averaged between 40,000 and 50,000 tons. I may add that the quality of the wood is excellent, and the quantity inexhaustible.

Fruits of every description are abundant, and

such is the fecundity of their production, that there are actually *forests* of fruit trees on many parts of the Atlantic plains. In the midst of this paradise of vegetable productions, where the veteran Bernal Díaz settled himself more than 300 years ago, we find now only a squalid remnant of the tribes of Aztecs and Agualulcos, numbering about 25,000 souls. The thrilling and dramatic history of this once mighty people naturally fills the imagination with conceptions of "fair women and brave men," but long slavery and oppression has crushed their hopes, and broken their hearts. An atmosphere of apathy pervades everything, and the whole race seem to have yielded themselves up to the stern decrees of fate. The men are inveterate drunkards, and their passion for drink is carried to the greatest excess. But there is no frenzy in their intoxication; they become dogged, sullen, silent, and beastly drunk. The children are grave and thoughtful. The women seldom, if ever, smile, and there is an air of sadness about them which is painfully oppressive. They cherish no longer the traditions of their people, save one only, and that is of Malinche. This noble woman, who was the first of her nation to receive the sacrament of baptism and the Christian name of *Marina*, was the daughter of the Cacique of Coatzacoalcos. But in her youth her father died, and her mother married again. The result of this union was an offspring upon whom the inhuman mother bestowed all of her affections, and as the newborn infant advanced in years, poor Malinche became an object of jealousy and hate. Fearing to imbue their hands in the blood of the innocent child, her parents, who shed hypocritical tears over a corpse of a little slave, sold her to some traders who were going to Tobasco, and pretended that Malinche was dead.

Long years afterwards, and when Malinche had grown to womanhood, the expedition of Cortez entered the river Grijalva, and there, because of her peerless beauty, she was presented as a gift to the conqueror of Mexico. From that hour she became his counsellor, his interpretress, and to her *misfortune*, his mistress.

Every page in the history of the conquest teems with the praises of this extraordinary woman, and her name is as imperishable as the memory of the events in which she bore so conspicuous a part.

Later, when the banners of Castile floated from every battlement in the conquered empire, she, who had told to Cortez the pitiful tale of her banishment, was restored by him to the home of her unhappy childhood. The Abbe Clavigero, one of the ablest writers on Mexico, thus briefly describes the visit: "She saw her mother and her brother, who presented themselves before her, bathed in tears, and covered with confusion, but she received and caressed them with great affection."

A quaint old Spanish writer on the events of the conquest, pays Malinche this invidious compliment. He says, "she was the first woman who ever accompanied an army without being a prejudice to it."

It is impossible to visit any habitable portion of the Isthmus—even the remote pueblas on the confines of Chiapas, or the scattered ranchos on the slopes of the Western Sierra—without hearing, from the untutored lips of the poorest Indians, the praises of Malinche. Go where you will, her memory is as fragrant as the lilies which everywhere bathe their drooping heads in the shining rivers; and many an Indian child is wooed to slumber by the melancholy song which its mother sings of the captivity and unrequited love of the Indian Princess.

In her native village, her memory is cherished with an affection which almost passes belief; on the return of her anniversary, a solemn mass is said for the repose of her soul. This is participated in by the inhabitants of all the neighboring towns, who flock in thousands, with floral offerings, to scatter over the grassy mound beneath which her remains are said to repose.

For weeks in advance, the young maidens nurse with tender care the choicest flowers that bloom in the vales, and as they twine their garlands, they chant the traditionary prayer, that she will some day return to the

ancient province of Coatzacoalcos, to sweep from the homes the blight she had involuntarily aided to bring.

I may here pause to observe, that the name of this province, which is so difficult of pronunciation, derives its origin from one of the Mexican deities, called *quatza-qualt*, whose insignia was a great feathered serpent.

Forgetful as the world ever is of the labors of the Catholic missionary, the question may be asked, how did he succeed? The answer for Mexico is, that the sword and sacrament went hand in hand, and that the hour which witnessed the subjugation of the Mexican Empire, saw also the conversion of its mysterious people to the dogmas of the Christian church.

The same miraculous circumstances which seemed to envelope the person of Cortez, and to crown all of his acts with success, surrounded also the threadbare friars who followed meekly in his glittering train. But they were learned and gifted men. The traditions of the Indians were ever utilized as a means for the introduction of the truths of Christianity. Even the *plants* and *fruits* were brought into requisition to prove that the Saviour died for the elevation of mankind.

It is recorded of a veteran priest that, failing once to convince a multitude who had gathered to witness the immolation of a human victim, he seized the Obsidian knife with which the sacrifice was to be made, and cutting a banana in two, showed them the wonderful effigy of the crucified Redeemer. The thorny *mimosa*, which grows along the isothermal line that passes through the Isthmus, and extends across the arid deserts of Barca to the Holy Land, is identical with the plant from which was woven, more than 1800 years ago, that agonizing garland, *the crown of thorns*.

It is impossible to look upon this emblem of torture, which mocks the pretensions of all human kings, without realizing, in thoughts too pathetic for utterance, how bitterly He suffered, who alone received "the Divine right" to wear a *crown*.

In every hut on the barren hill sides, where

the mimosa grows, this sad memento of the crucifixion is kept to remind the simple inmates of that most awful event in the history of the Christian religion.

The exquisite flower of *espiritu santo*, which is so called because it contains between the folds of its snow-white leaves the remarkable image of a *dove*, was the means by which the Indians on the Pacific plains were taught the soothing doctrine of the Holy Spirit.

In the explanations which have been given to the Mexican paintings in Lord Kingsborough's collection, we are astonished at the approximate coincidence in the character and attributes of the Zapotecan Deity, *quatza-qualt*, and those of our Saviour. It was by tracing this similitude in that painting, that the Dominican fathers made the first substantial inroad into the fearful rites of these idolatrous people.

The explanation of this remarkable painting is that the God of the Milky Way sent a messenger to a virgin in Tulan, telling her that it was the will of the gods that she should conceive a son; which she did, without having known man. This offspring was Quatza-qualt, whose name signifies "our dearest son." He was the first who invoked the gods, sacrificed to them, made penance in order to appease them and to expiate the sins of mankind. He sacrificed even himself, drawing his own blood with a thorn, and after death rose again to sit in glory opposite to *Cantico*, in honor of his penance and abstinence. He was the only god with a human body, and it was *he* who created the world and the first man.

This wonderful interpretation of the attributes of one of the greatest Mexican deities, afforded a ready means to convert the nation and to substitute the true God for the false one. But, alas! this is the sole refreshing circumstance in the torn and faded history of their conquest and subjugation.

The Indian language on the Atlantic plains is a mixture of Maya and Aztec, replete with corrupt and broken sentences of Spanish, but in a little while this wretched dialect which is spoken by them, will die out, and leave no

trace of the distinctive origin of the two tribes. In their persons the Indians are somewhat below the medium stature, but squarely built and of great muscular strength. The women on the other hand are more delicate in frame, and in some instances beautiful and well-proportioned—a beauty which is enhanced by their unpurchasable virtue and their devotion to home. In matters of dress they wear the plainest and coarsest materials, confining their decorations alone to the head. Sometimes the hair is bound up in shining masses, with gay-colored ribbons and interspersed with wild flowers, which grow everywhere in great profusion. Sometimes, on the occasion of a *fiesta*, the cucullo—a beetle which emits a flashing phosphorescent light—is introduced among the raven clusters of hair, as an auxillary to the Indian maiden's charms.

In the country to the east of the Coatzacoalcos, there are numerous evidences of the history of a once vast and powerful people. These consist chiefly in the number of mounds, artificial wells, copper hatchets, obsidian knives, razors, and other implements which are scattered over the country. In some reconnaissances which I made of the lands bordering the Tancochapa River in 1851, I found many of these relics; and, indeed, other unmistakable traces of a comparatively advanced state of civilization. Near the town of Ishuatlan in the direction of the Gulf of Mexico, there is said to be a huge stone idol and the ruins of an ancient temple. It is not improbable that this may be the spot where Bernal Diaz "sowed his eight orange seeds," the first which were brought to Mexico. The old veteran, after telling us that he planted the seeds at the foot of the temple in gratitude for a night's sleep without molestation from the mosquitoes, says: "I have merely related this in order to acquaint my reader that these were the first orange seeds that were planted in New Spain." So after all, the delicious fruit is not indigenous to Mexico, according to Bernal Diaz.

A remarkable ethnological fact is the existence of a race of dumb people, of which there

are numerous families near Jaltipan. However strange this may appear, it is nevertheless certain, and the *Ranchos de los nudos* (dumb settlement) established a few years since near the lower part of the Island of Tacamichapa, owes its designation to the fact that the individuals are all dumb who inhabit the three or four houses which form this settlement. They intermarry, and thus perhaps this silent race is perpetuated. I may here mention that when a child is born among them with the gift of speech, it is invariably thrust aside.

Of the towns that existed anterior to the conquest, there are several west of the Coatzacoalcos, all of which retain their Indian names, and are readily recognized on the maps published about the time of the conquest. The most important of these is Acaqueaur, once the court and residence of the father of Malinche, who was one of the most powerful caciques of the great Aztec Empire. It is now the capital of the Department, and a place of considerable importance. Near the junction of the River San Antonio, but scarcely discernable amid the densely luxuriant foliage, are the ruins of the settlement of *Espiritu Santo*, founded by the Conquistadores in 1522. This was the home of the honest old soldier Bernal Diaz, who lived for upwards of thirty years in the province. For a long period it continued to be a flourishing town, but was sacked and burned by the buccaneers in 1683. It is said that the pirates even stole the bell from the chapel and carried it to Tortugas, where they added it to the chimes of the church in which they offered up their accustomed prayers after a successful marauding expedition.

At the present time Mina-titlan, which is the head of ship navigation on the Coatzacoalcos, twenty miles from the sea, is a place of considerable importance. Under the developing influences of the newly established transit route, it has risen from the degradation of a Mexican-Indian village to the dignity of a bustling American town. The climate of this section, from the alluvial character of the soil and the dense vegetation, is less healthy than that of

the other. During the rainy season, which begins in June and ends in November, persons not acclimated are subject to attack of *Calentura*—a mild form of intermittent fever, due to miasmatic poison. It is a well-noticed fact in tropical climates at least, that the miasma invariably lingers in the foliage of plants. Hence it is that the natives adopt the custom of fixing their camping places in the open air beyond the shadows of the trees. It would be a task indeed to attempt a description of the matchless scenery between the navigable extremities of the Coatzacoalcos. For a distance of more than ninety miles, the river threads its silvery course through evergreen palisades of waving palms. Thousands of creeping plants decked with blossoms, bend downward from the overarching growth above forming the most fantastic bowers. In such fairy scenes as these, birds of exquisite plumage sweep the air in their flight, and make the dense forest ring with the melody of their songs.

On the River Jaltepec, one of the exploring parties under my command penetrated an extensive cave on the southern bank of that river about thirty miles from its confluence with the Coatzacoalcos. Lieut. Ring, who conducted the expedition, in his official letter to me describes the head of a lion at the entrance of the cave, carved in bas-relief in the solid rock with such surpassing beauty that it startled him. Penetrating further, the stalactites pendant from the vaulted ceiling of this enchanting cavern, glistened in the light of their torches like branches of burnished silver. On every side were magic fountains that seemed to throw up alternate handfulls of opals and pearls. From this cave many interesting relics were obtained, among which I find an artistically modeled eagle's beak,* which seemed to have served as the handle of some vessel. This will show in a measure how well the people of this *now lonely* region conducted their approaches to the impregnable fortress of perfect civilization.

* This was exhibited to the audience, and is now in the possession of Judge Daly.

Passing to the central division, as we rise above the alluvial bottoms of the Coatzacoalcos, the vegetation which is of a soft and succulent character, changes to that of a fine and cellular tissue, as the mahogany, cedar, zapote, and acacia.

The road out from Suchil (the head of shoal water navigation,) leads through a dense forest of these trees for twenty-five miles, crossing the Tortugano and Jumnapa Rivers, beyond which begins the rolling prairies of Sarabia, and the clear open country. High up on an abrupt spur of the Cordillera towards the west, is the town of *San Juan Guichicori*, which is said to have been settled a long time anterior to the conquest. There is a curious tradition of these Indians which runs thus: In one of the fearful struggles for dominion in Peru, a small nation called *Mijes* who inhabited the valleys of the Andes, fled from the oppressive tasks and cruelties of their conquerors to the north. Following for many weary months the bases of the mountains which skirt the sinuous coast of the Pacific, they passed peacefully through the kingdom of the Tapotecos, and finally reached the plains of Sarabia. Believing themselves secure from further persecutions, they determined to subject the land to the test of fire.

For this purpose the sacred ember was buried at the setting of the sun, and throughout the night they held their gloomy incantations. On the following day the ember was found to be extinguished, and with sorrowing hearts they obeyed the mandate of their oracle to push their journey further. Leaving the plains, they defiled westward through the mountain gorges and climbed the rugged steepes of the Cordillera, where, exhausted from fatigue and the burning heat of their wrathful deity, they halted under the spreading shades of an enormous *cuapinol* tree. The beauty of the scenery, and the high hills which concealed them from view, determined the chiefs to resort again to the sacred fire. Another night of fearful suspense closed upon the *Mijes*, but when the sun rose resplendent in the east, its dazzling light fell upon the

still burning ember, which sent up its curling incense to the god of day, and the joyous songs of the wandering nation announced that the pilgrimage had ceased. It was upon this spot that they determined to found a city, which they called in the language of the Mijes, Huitzi-cou, pronounced by the Spaniards Giutzicovi, signifying *pueblo nuevo*, or new settlement.

Whether this tradition be true or false, there is one circumstance which seems to confirm it. The Guichicovi Indians have among them the Peruvian Alpaca, (*Auchenia*), and they are the only cultivators of the potato on the Isthmus. If, then, the vegetables, like the languages and physiognomy of nations, indicate either an identity of race or ancient communication between men who live under different climates, they may become the most imperishable historical monuments. In this view perhaps the tradition is true. One thing is certain—the Mijes differ in essential respects from all the other tribes on the Isthmus.

The lands in the central division, though less fertile (except on the river margins,) than those which lie nearer the Gulf, present every variety of soil and production, and the climate without question is the healthiest on the Isthmus, because this portion of the route is more elevated and better drained. The scenery all through here is surpassingly beautiful, and the vista from the summit of the Malatengo Hills, with its magic effects of light and shade, might challenge the noblest efforts of a Claude Lorraine. From these gigantic hillocks we see spread out before us like a map, the *estates of Marquesanas*—the gift lands of Charles V to the Conqueror of Mexico—stretching away to the south, even beyond the sharp angular peaks of the dividing ridge. All through this vast estate, which embraces an area of somewhat less than 200,000 acres, there are ruins of indigo vats, lime-kilns, corrals, and other improvements. But it has long since passed away from the descendants of Cortez, among whom, in my curious researches I find the family of that charming little songstress, *Piccolomini*. In 1835 the Duke of Monteleone, becoming no

doubt tired of the shameful mismanagement of the estate, ordered it to be sold, and from that time it passed into the hands of Don Esteban Maqueo and Don Joaquin de Guergue, who are the present proprietors. The principal Hacienda is at Chirela, which lies at the entrance of the portals, through which the railroad will undoubtedly pass. This princely domain is a vast uncultivated tract, and gives employment only to a few *vaqueros* who spend their time among the half-fed cattle which dot the barren hill sides of the Pass.

The inhabitants of this section are all of the tribe of Zapotecos, with the exception of those who occupy the village of El Barrio. These are a half-caste between the Indian and the Negroes, who were emancipated from the estates of Cortez. They are noted only for their idle habits and love of mischief.

One of the most interesting points in the Pass of Chivela is the thermal springs lying at the foot of the bleak and frowning Cerro Prido. This spring has its sources in one of the tributary streams of the Rio Verde, and is flanked on either side by perpendicular cliffs of compact limestone, which rise to a height of 200 feet. This defile is not more than two hundred yards in width at the point of greatest separation, and the surfaces of the grotesque rocks present the appearance of having been rent asunder in some fearful convulsion of the elements. High up, and near the summit of these over-hanging natural battlements, the green cactus and the clambering ivy, struggle together to hide the shrivelled faces of the rocks, which everywhere bear marks of the bloody sacrifices of the vultures, that build their nests in this wild and romantic spot. From midway down are the open entrances to innumerable caverns, penetrating into the mysterious depths of this weird-like mountain. Beneath, however, all is calm, and decked in spring-like beauty; clustering round the foundations of these rugged palisades, the passion-flower and the convolvulus twine themselves in loving embraces. The finisbrated acacia grows all along the borders of the stream, and mingles its odors with those

of the blossoming *sucil*. The springs are numerous, but in lieu of having a uniform source, they issue at irregular distances from between the boulders that lay huddled together in the bed of the river; they however have a common receptacle in the little azure lake, the thermal waters of which lave the foot of the canon. A crude chemical analysis, such only as I could make on the spot, showed the water to be impregnated more or less with potash, sulphur, and mineral salts, while its temperature ranged between 92° and 97° of Fahrenheit. The natives ascribe to this spring the most miraculous properties, and hundreds flock there annually from the remotest places—even Puebla—to enjoy a bath in its deliciously-tempered waters. At the head of this spring is an extensive cave, penetrating the rock for several hundred feet, and branching off into galleries, ante-chambers, and numerous other apartments. The entrance is partially concealed by huge rocks, at the bases of which is the figure of what it requires but a very little imagination to discover a crouched lion rudely hewn out of one of the masses of marble that lie scattered in the most grotesque heaps along the shores of the silvery stream. Entering the cave by a narrow passage-way, which is not unlike the wing entrance to a theatre, access is had to the main portal, over which is distinctly visible in the focus of the peering daylight, a gigantic red right hand; and painted along the arched passage-way underneath this, and overhead until completely lost in the darkness, is a series of hieroglyphics in two parallel lines. These bear a remarkable resemblance to the angular characters of the ancient Greek and Phœnician. From this cave in one of the galleries, I was enabled to obtain a curiously devised retort;* and since my return from the Isthmus, human bones and other vestiges have been discovered by those who have prosecuted the exploration. In the neighborhood of Santo Domingo, there are also numerous caves; the principal one is elevated about 700 feet above the base of the limestone moun-

tain which frowns upon the village, and is accessible only by a steep and circuitous path. The entrance to the cave has an arch spanning 80 ft. by 20 in height, and the plane of the floor cuts the horizon at an angle of 30°, until reaching a depth of 100 feet below. At the foot of this slope is a magnificent apartment some 300 feet in diameter, and 50 in height, with its sides ornamented with stalactites and stalagmites of every conceivable form and variety. Beyond this ante-chamber the cave extends into the mountain for a distance of over 1000 feet; sometimes expanding into large halls, or forming regular arched passage-ways several hundred feet in length; alternately ascending and descending into ridges and valleys. On the wall at the extreme end of the cave are several circular paintings, probably intended as imitations of the Calendar stones. There are also others of the sun and moon, and several representations of the human hand, besides bones, fragments of pottery and arrow-heads.

That gold exists in the Chivela Pass in very considerable quantities, there can be no reasonable doubt. But its discovery is far from being of recent date. It is a well-known fact that the crown on the statue of the Virgin in the church at Chihuitan is of pure gold, and that it came from the bed of the Rio Verde in the precise locality where the present discoveries have been made. This crown is upwards of fifty years old, and was fabricated at a time when Tehuantepec was a bustling town under the old Spanish regime. Some gold has also been found in the Almaloya; but up to this date a severe day's work has not yielded over three dollar's worth of the precious metal. It occurs in the ferruginous sands in the dry valleys and gorges, but the grains are very small, usually flattened scales, showing that in the original rock it is laminated. Some very fair specimens have been found in fragments of talcoze schist, with veins of quartz. This schist is invariably more or less decomposed, and stained with iron rust. The gold thus found in the cellular pockets of the quartzose rock, is associated with copper pyrites, specular iron ore

* Exhibited. Now in the possession of Judge Daly.

hematite, &c. It is impossible to say what results may follow from closer mineralogical inspections of the gold fields of the Isthmus. But one thing is certain, we know from the manner in which gold occurs here, that the mining thereof will be an expensive and tedious operation.

Every one who has passed over the road between Almaloya and the Rio Verde, has been struck with the strong resemblance which the country bears to the metalliferous tracts of Mariposa, and this remark was often made by the California passengers long before any gold was found. My own impressions are that silver is far more abundant in all that locality; and that the rock excavations, which will have to be made through the dividing ridge on the railroad line, will develop veins of incomparable richness. Galena exists almost everywhere in the Chivela Pass; and an antimonial sulphuret of silver occurs here and there with native copper.

The Zoques (still another tribe distinct in all respects,) inhabit the mountainous region to the extreme east, from the valley of the Chiapa on the South, to the Rio del Corte on the north. Originally occupying a small province lying on the confines of Tobasco, they were subjugated by the expedition to Chiapas under Luis Marin. At present they are confined to the village of San Miguel and Santa Maria Chimalapa. They are easily distinguished by the prominence of their features and the singular custom they have of shaving the crown of the head. Their love for liquor is inordinate, and their manners are coarse and vulgar, but they are patient, enduring, and industrious. On the cleared portions of the Sierra they cultivate large quantities of delicious oranges, maize, and tobacco; and their manufacture of articles from the ixtle and pita, is justly celebrated over the Isthmus. Mentally, they are deplorably ignorant, and their conceptions of the Deity and of religion, are vague and indefinite.

Passing to the southern division of the Isthmus, we find it particularly rich in antiquarian

remains. The road which leads from Oaxaca to Tehuantepec crosses a defile near *Mistequilla*, overhung by an eminence, called in the Zapotec language *Guiengola*, which means *large stone*.

When King Cosyoeza began his struggle for dominion against the Emperor Montezuma, he made on this hill, which he had previously fortified and well supplied with arms, ammunition and provisions, the brilliant defence which secured to him the sovereignty of the lands. It appears that in those times there were in the hill several springs of water, of which not the slightest trace now remains; but there are still to be seen splendid ruins of fortifications and vast barracks.

The Hill of Coscomate, near to Zanatepec, is called the hill of the sun and moon, from two colossal representations of these heavenly bodies, carved in the solid rock, which are described as illustrated by an inscription in unknown characters. The name of *Cerro del Venado* (deer-hill) is likewise attributed to an effigy of this animal being hewn out of one of the rocks. The old men who accompanied Sr. Moro in one of his expeditions to the upper *Ostuta*, pointed out the situation of a valley about nine miles east of the Cerro del Venado, where they found the remains of a large town, with buildings of stone.

The cacique Cosijopi, at the beginning of his reign, offered up a solemn sacrifice to the greatest idol of Zapotecos, called the Heart of the Kingdom, which was placed on the island known as the Enchanted Hill, situated in the center of the Lagoons. The idols which were found in this island are of terra-cotta. Their character is very different from those made by the Aztecs, and some of them are not without merit. It is asserted that the Island of Tilema possesses several objects of archeological interest, and that in another island the remains of an abandoned town are still to be seen.

The Zapotecos, who numbered about 30,000 souls, constitute the greater part of the population of the southern division of the Isthmus, and are incomparably superior to those of any other portion. The salubrity of the climate,

the surpassing fertility of the soil, and the variety and richness of its productions, all minister to the prosperity of the inhabitants, who have, from the most remote periods of their history, been distinguished for their advances in civilization. Their knowledge of the mechanic arts was not limited, even in the days of the conquest, and their well fortified towns did not fail to attract the admiration, or excite the jealousies of the ancient kings of Anahuac.

Intellectually, the aborigines of Tehuantepec exhibit qualities of no mean order, and they are found to be intelligent, docile, and lively. In personal appearance, they are noted for the symmetry of their forms, the regularity of their features, and the vigor and sprightliness of their character. The women are delicately made, mercurial, voluptuous, and full of vivacity. They are particularly remarkable for the exquisite grace of their carriage, the winning softness of their manner of expression, and their love of gay costumes. In morals they are loose, and full of intrigue; but in habits they are temperate and industrious; many of them weave admirable fabrics from the wild silk and cotton, and their manufacture of conserves is unequalled in Mexico. The town of Tehuantepec gives employment to persons of various occupations, and its appearance is enlivened by the shops of carpenters, silversmiths, tanners, shoemakers, saddlers, and bakers. The manufacture of soap is very considerable, and the export of buckskins constitutes a lucrative trade.

The Indians of Juchitan, though numerically less than those of Tehuantepec, form an important part of the inhabitants of the Isthmus, as being superior in every respect. They are bold, independent, industrious and temperate, possessing great muscular strength, and a high degree of mental capacity.

The Huaves, who, according to their traditions, also came originally from Peru, and once a powerful race, have, from the successive struggles for supremacy with the Zapotecos, dwindled down to a little more than three thousand, scattered over the sandy peninsulas formed by the lagunes and the Pacific. They are

generally robust and well formed; some of them evince a high degree of intelligence, but the majority are grossly ignorant. The Huaves of both sexes are habitually in a state of almost complete nudity. Their industry consists of little else than fishing, and even this they can only do by means of sweep-nets. It is a singular fact that although the Huaves are chiefly fishermen, very few among them know how to swim.

They have an acute ear for music, and among the instruments which are peculiar to them is the *Marimbo*, an instrument formed of slats of hard wood, decreasing regularly in length like the *Pandean* of pipes according to the gravity or acuteness of the sound. The instrument is played upon by striking the slats with a sort of drumstick. They are isolated, and the blow produces a short, tinkling silvery note, like a stroke upon a glass tumbler. It contains three octaves, and each slat or stave is fastened on a frame over a series of wooden pipes, similar to the reed stops of an organ, by which arrangement body is added to the notes. Two drumsticks may be used, and thus harmony produced; and the instrument is even played upon by two performers, each using two sticks. When the performer wishes to change the register of the tones, he flattens certain notes by sticking on the respective slats a little piece of composition formed of wax and india rubber, thus obtaining a greater variety of combination.

Such, Gentlemen of the Geographical Society, are the inhabitants of the Isthmus of Tehuantepec, and such their customs and peculiarities hastily and imperfectly sketched forth. It cannot be denied that in the recital there is much to sadden every one who considers ever so slightly the resources of a country which might be great and prosperous, but which is now cursed with stagnation and death. Still, there are elements of power and of energetic and happy life in the land, which time cannot fail to bring forth and develop, for they await only the neigh of the iron horse to start up into healthful and beneficent activity.

NORTHMEN IN AMERICA.

Communicated by PROF. CH. C. RAFFN, and founded on his work "ANTIQUITATES AMERICANÆ, sive Scriptores Septentrionales rerum Ante-Columbianarum in America," published by him in 1837 through the ROYAL SOCIETY OF NORTHERN ANTIQUARIES of Copenhagen.

The Dane Gardar, of Swedish origin, was the first Northman who discovered Iceland, in 863. Only a few out-places of this country had been visited previously, about seventy years before, by Irish hermits. Eleven years subsequently, or in 874, the Norwegian Ingolf began the colonizations of the country, which was completed during a space of sixty years. The colonists, many of whom belonged to the most illustrious and most civilized families in the North, established in Iceland a flourishing Republic. Here, on this distant isle-rock, the Old-Danish or Old-Northern language was preserved unchanged for centuries, and here in the *Eddas* were treasured those Folk-songs and Folk-myths, and in the *Sagas* those historical Tales and Legends, which the first settlers had brought with them from their Scandinavian mother-lands. Iceland was therefore the cradle of an historical literature of immense value.

The situation of the island and the relationship of the colony to foreign countries in its earlier period, compelled its inhabitants to exercise and develop their hereditary maritime skill and thirst for new discoveries across the great Ocean. As early as the year 877 Gunnbiorn saw for the first time the mountainous coast of Greenland. But this land was first visited by Erik the Red, in 983, who three years afterwards, in 986, by means of Icelandic emigrants, established the first colony on its south-western shore, where afterwards, in 1124, the Bishop's See of Gardar was founded, which subsisted for upwards of three hundred years. The chief firths or bays were named after the heads of the expedition. Erik the Red settled in Eriks-firth, Einar, Rafn and Ketil in the firths called after them, and Heriulf on Heriulfsnes. On a voyage from Iceland to Greenland this same year (986), Biarne, the son of the latter, was driven far out to sea

towards the south-west, and for the first time beheld the coasts of the American lands, afterwards visited and named by his countrymen. In order to examine these countries more narrowly, Leif the Fortunate, son of Erik the Red, undertook a voyage of discovery thither in the year 1000. He landed on the shores described by Biarne, detailed the character of these lands more exactly, and gave them names according to their appearance: Helluland (Newfoundland) was so called from its flat stones, Markland (Nova-Scotia) from its woods, and Vineland (New England) from its vines. Here he remained for some time, and constructed large houses, called after him Leifsbudir (*Lief's Booths*). A German named Tyrker, who accompanied Leif on this voyage, was the man who found the wild vines, which he recognized from having seen them in his own land, and Leif gave the country its name from this circumstance. Two years afterwards Leif's brother, Thorwald, repaired thither, and in 1003 caused an expedition to be undertaken to the south, along the shore, but he was killed in the summer of 1004 on a voyage northwards, in a skirmish with the natives.

The most distinguished however of all the first American discoverers is Thorfinn Karlsefne, an Icelander, whose genealogy is carried back in the Old-Northern annals to Danish, Swedish, Norwegian, Scottish and Irish ancestors, some of them of royal blood. In 1006 this chief on a merchant-voyage visited Greenland and there married Gudrid, the widow of Thorstein (son of Erik the Red), who had died the year before in an unsuccessful expedition to Vineland. Accompanied by his wife, who encouraged him to this voyage, and by a crew of 160 men on board three vessels, he repaired in the spring of 1007 to Vineland, where he remained for three years, and had communications with the aborigines. Here his wife Gudrid bore him a son Snorre, who became the founder of an illustrious family in Iceland, which gave that island several of its first bishops. His daughter's son was the celebrated Bishop Thorlak Runolfson, who published the first Christian Code of Ice-

land. In 1121 Bishop Erik sailed to Vineland from Greenland, doubtless for the purpose of strengthening his countrymen in their Christian faith.

The notices given by the old Icelandic voyage-chroniclers respecting the climate, the soil and the productions of this new country are very characteristic. Nay, we have even a statement of this kind as old as the eleventh century from a writer not a Northman—Adam of Bremen; he states, on the authority of Svein Estridson, the King of Denmark, a nephew of Canute the Great, that the country got its name from the vine growing wild there. It is a remarkable coincidence in this respect that its English re-discoverers, for the same reason, name the large island which is close off the coast *Martha's Vineyard*. Spontaneously growing wheat (maize or Indian corn) was also found in this country.

In the meantime it is the total result of the nautical, geographical and astronomical evidences in the original documents, which places the situation of the countries discovered beyond all doubt. The number of days' sail between the several newly-found lands, the striking description of the coasts, especially the white sand-banks of Nova Scotia and the long beaches and downs of a peculiar appearance on Cape Cod (the *Kialarnes* and *Furdustrandir* of the Northmen) are not to be mistaken. In addition hereto we have the astronomical remark that the shortest day in Vineland was 9 hours long, which fixes the latitude of $41^{\circ} 24' 10''$, or just that of the promontories which limit the entrances to Mount Hope Bay, where Leif's booths were built, and in the district around which the old Northmen had their head establishment, which was named by them Hop.

The Northmen were also acquainted with American land still farther to the South, called by them *Hvitramannaland* (the land of the White Men) or *Ireland-it-mikla* (Great Ireland). The exact situation of this country is not stated; it was probably North and South Carolina, Georgia and Florida. In 1266 some priests at Gardar in Greenland set on foot a

voyage of discovery to the arctic regions of America. An astronomical observation proves that this took place through Lancaster Sound and Barrow's Strait to the latitude of Wellington Channel. The last memorandum supplied by the old Icelandic records, is a voyage from Greenland to Markland in 1347.

EXPEDITIONS AND EXPLORATIONS.

1. *Paraguay Expedition*.—The United States' exploring steamer "Argentina," Captain Page, was to leave Buenos Ayres about the 20th April, for the Rio Paraguay, accompanied by the small steamer "Alpha." The expedition-vessels will proceed, in the first instance, direct to the sources of the Paraguay, and will then ascend the Pilcomayo. The "Argentina" will go as far as her draught will permit her, when the explorers will embark in the Alpha.

2. *Expedition from St. Paul to British Columbia*.—St. Paul, Minn., is situated in lat. 45° , and long. 93° ; Fort Thompson, in lat. 51° , and long. 122° west. Between these two points is an immense and little known region, comprising the valleys of the Minnesota, the Red River of the North, the Assiniboine, Lake Winnipeg, and both branches of the Saskatchewan. Beyond the latter are the Rocky Mountains, and west of the mountains, Fraser River, (the seat of the new gold region,) flowing into the Gulf of Georgia, opposite Vancouver's Island, and within a few miles of Washington Territory.

With a view to explore this region, an expedition is now being organized, and will set out early in June from St. Paul, for a thorough and careful exploration of the region described.

The route of the expedition will be direct to the headwaters of the Red River; thence by steamboat to Pembina; thence north-westerly to the great bend of the South Saskatchewan; thence to the sources of that river in or near the Kootanais Pass of the Rocky Mountains. This pass is in about lat. 50° north. It is proposed here to explore the eastern base of the mountains, prospecting for gold in the streams, and obtaining full particulars of the climate

and material resources of the country, as far north as Edmonton, on the north branch of the Saskatchewan. The exploring expedition will be accompanied by competent miners, in the expectation that gold deposits will be discovered. From Edmonton, the expedition will follow the express route of the Hudson's Bay Company to the Canoe Country, or the sources of Thompson River, where, close to the western base of the Rocky Mountains, the richest gold fields of British Columbia have been found. Here, if it be deemed expedient, the expedition will divide—one party going to the Pacific Ocean, and the other undertaking to explore the sources of the Columbia River and the region occupied by the Kootanais Indians. The latter party will return by Lewis and Clark's Pass, the Falls of the Missouri, and the valley of Milk River to Fort Mandan, and thence by Big Stone Lake and Fort Ridgely to St. Paul. Both parties will return during the present season.

The expedition is fully equipped with scientific instruments, and is accompanied by several physicians. The cost is estimated at about \$300 per man. It is to be led by Messrs. Wm. H. Nobles, of St. Paul, and Geo. B. Olmstead, of Fort Ripley—the first-named in charge of the Columbia division, and the latter in charge of the Pacific division. The expedition was organized as a purely private adventure, but the City Council of St. Paul subsequently, by resolution, adopted the programme, and thus gave it somewhat of an official character.

3. *Another North-West Expedition.*—Several citizens of St. Paul have purchased the small steamer Jeannette Roberts, 112 tons burden, and of very light draft, and contemplate the unexampled task of conveying it into the waters of the Red River of the North; but between Big Stone Lake and Lake Traverse, the source of the Red River, there is a strip of low land about three-fourths of a mile wide, forming the divide between the two valleys, and which, in the spring season, is overflowed so as to permit at least of canoe navigation from one lake to the other. The depth of the water on

this portage is frequently from twenty to twenty-four inches, and this steamer, it is believed, can be got over. Once in Lake Traverse the course is free far into the British Possessions. It is the intention of the party about to attempt this exploit, to proceed at once to Pembina and Fort Garry. The expedition, it is proposed, will start on the 21st May, taking with them a year's outfit and provisions.

This expedition goes into a country mostly inhabited by Indians—the Sioux and Yankton tribes—who are friendly to the whites. If successful, it will open a lucrative trade not only with them, but also with Pembina and the Selkirk settlement. The course of the Pembina trade is at present by dog-trains, overland to St. Paul.

Eventually, another steamer will connect at the land pass between the two lakes, and form a continuous line between St. Paul and the Red River settlements. Captain Davis, now commanding one of the Prairie du Chien and St. Paul packets, has charge of the expedition, and intends to take along with him several ship carpenters to Lake Traverse; and there, converting his steamer into a saw-mill, spend the fall in preparing timber for building two other steamers, and have them ready by the spring of 1860.

4. *Survey of the St. Lawrence.*—The British Government has ordered an accurate survey of the Straits of Belleisle and the River and Gulf of St. Lawrence. The operations are to be superintended by Commander Orlebar, R.N. The work will be commenced as soon, and be continued to as late a date as the seasons will permit of. A part of the commander's force will be detached, for the purpose of re-examining and correcting the survey of the upper part of the river, made about thirty years ago. This is a most necessary and important work, more particularly as regards the lower part of the river. An accurate survey completed, and its dangers to navigation indicated by lighthouses and other nautical appliances where necessary, will do away with the evil repute which has ever attached to this

great navigable stream. It is the more necessary, since the St. Lawrence has become a common highway of trade from the teeming West to Europe; and it is equally with the Mississippi, the scene of a vast steamboating interest.

DEPARTMENT OF STATISTICS.

STATISTICS OF GUANO.

GUANO or "huanu" is a Peruvian or Quichua word, signifying "manure." In commerce the name is applied to a peculiar fertilizer, found in its greatest essential strength in rainless regions, and mainly on islands and rocky promontories. It is simply the dung or excrement of sea-fowls, (and sometimes of turtles and seals,) which has been accumulating through uncounted ages; and which on the group of Chincha, off the coast of Peru—according to Humboldt—has attained the enormous depth of 50 to 60 feet. In three hundred years, however, the deposits had not increased for more than a third to half an inch, and hence where the greatest accumulation has occurred, the process of formation must have been going on from times long anterior to either traditional or written history.

Though the true nature of this substance was not known to the civilized world before the visit of Humboldt to South America, it was well known to the subjects of the Incas; and in all the works relating to the ancient agriculture of the Peruvians, its value as a fertilizer is spoken of. The early navigators were also cognizant of the guano islands, and had seen cargoes of this deposit conveyed from the islands to the adjacent mainland, and witnessed its effects in stimulating the growth of crops.

On his return from South America in 1806, Humboldt transmitted samples of this substance to the chemists Fourcroy and Vauquelin of Paris. Their elaborate analysis, published in the "Annales de Chimie," (vol. 56,) introduced it fairly to the scientific world, and caused its real importance to be fully recognized. In 1810 Gen. Beatson, then on the Island of St. Helena, at the suggestion of Sir Joseph Banks, made an elaborate series of experiments with

guano on the potato, which were interesting alike from their novelty and from their useful results. But no practical application was made of this substance either in Europe or the United States until 1824, in which year the late Mr. Skinner, then editor of the *American Farmer*, received two barrels of it at Baltimore. This first importation into this country was distributed in small parcels for experiment; and one of the recipients, ex-Gov. Lloyd of Maryland, pronounced it to be "the most powerful manure he had ever seen applied to Indian corn."

Years elapsed, and no further means were taken to bring it into use. True, that in the meantime both Europe and North America had received samples from Peru, but only in such quantities as to constitute them rather matters of curiosity than utilitarian purpose. In 1840, twenty barrels were received in England. But notwithstanding the astonishing results from its application to the soil, the fear that the enormous crops realized under its stimulus might exhaust the land of its productive elements, deterred the great body of the farmers from availing themselves of so valuable a fertilizer. Repeated experiments, however, at length convinced the most sceptical of the error of this prejudice, and at the same time that the new commodity was the safest, cheapest, and most potent of known manures. Its consumption now became general, and the guano trade expanded rapidly into a vast commercial and industrial interest.

The imports into the United Kingdom from the commencement of the trade to the end of the year 1857, amounted to 2,373,308 tons, and year by year as follows:

	Tons		Tons		Tons
1841....	2,981	1847....	82,392	1853....	123,166
1842....	20,398	1848....	71,414	1854....	235,111
1843....	3,002	1849....	83,438	1855....	305,061
1844....	104,251	1850....	116,925	1856....	191,501
1845....	283,300	1851....	243,014	1857....	288,362
1846....	89,203	1852....	129,889	(2,373,308 tons.)	

These figures, it must be understood, include also the quantities re-exported, which must have been to a considerable amount—chiefly to the continent of Europe. The principal sources from which this supply was procured, are noted

in the following table. The minor and indirect sources are aggregated under a common head.

	W Coast of Africa.	Br. Poss. in S. Afr.	Chile.	South America. Peru.	Batavia.	Patag'a.	Other sources.
1841.....	819	2,062
1842.....	6,167	14,231
1843.....	1,234	1,889
1844.....	9,743	16,475
1845.....	76,898	11,656
1846.....	207,679	14,101
1847.....	6,309	22,410
1848.....	1,146	57,762
1849.....	184	1,668
1850.....	950	61,055
1851.....	2,345	3,136
1852.....	767	73,667
1853.....	2,953	95,083
1854.....	6,224	1,212
1855.....	2,626	5,687
1856.....	6,183	6,719
1857.....	10,165	7,359
1858.....	3,184	9,672
1859.....	4,192	7,445
1860.....	880	6,917
1861.....	5,820	2,209
1862.....	106,312	9,116
1863.....	221,747	44,089
1864.....	5,437	8,304
1865.....	2,353	699
1866.....	976	1,162
1867.....	1,987	807
1868.....	1,022	177,016
1869.....	1,987	261,892
1870.....	1,022	261,892
1871.....	1,022	261,892
1872.....	1,022	261,892
1873.....	1,022	261,892
1874.....	1,022	261,892
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1900.....	1,022	261,892
1901.....	1,022	261,892
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1911.....	1,022	261,892
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1920.....	1,022	261,892
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2012.....	1,022	261,892
2013.....	1,022	261,892
2014.....	1,022	261,892
2015.....	1,022	261,892
2016.....	1,022	261,892
2017.....	1,022	261,892
2018.....	1,022	261,892
2019.....	1,022	261,892</

The continent of Europe, with the exception, perhaps, of France and Spain, receives its supplies indirectly, chiefly by way of Great Britain; nor are statistics convenient to show to what amount it is used. The quantity shipped from Peru to Spain in 1858, was 27,160, and to France 25,545 tons—together about one-fifth of the whole exported from that country. The West India Islands are also consumers, and several of them producers also. Guano is also largely imported into Mauritius, and it is to this substance, in connection with the free importation of Coolie labor, that that island owes its rapid and sustained development. Guano is also largely used on the lands in Barbadoes—the dense population of which gives it also an abundance of labor. Mauritius and Barbadoes indeed have, from the two great elements of agricultural prosperity—guano and abundant labor—become the most flourishing sugar colonies of the British Empire, and in production have far outstripped the most prosperous of the countries in which slave-labor is used.

"Guano (we quote the Report of the Com. of Patents for 1854,) like all kinds of animal excrements, varies materially in its quality according to the nature of the food habitually used. The richer and more nutritious it is, the greater will be the fertilizing properties of the manure. Hence the dung of the highly-fed race-horse is more valuable than that of the drudge-horse released from the cart and kept upon low fare. For the very same reason the excrementitious deposits of birds feeding upon fish or flesh, afford a stronger manure than parrots or pigeons which live on berries and grain. Again, guano is very materially influenced by the age and climate in which it is found. Thus, during the first year of its deposit in Bolivia or Peru, the stratum is whitish and abounds in uric acid; but in the lower strata, which have existed perhaps for ages, the color is a rusty red, as if tinged with oxide of iron. They become progressively more and more solid from the surface downward—a circumstance naturally accounted for by the gradual

accumulation of the strata, and the evaporation of the volatile parts. In all climates subject to rains and heavy dews, the guano exposed to their influence undergoes fermentation, loses a portion of its ammoniacal salts by the decomposition, and thereby is diminished in value. The excrement of the birds, when first deposited, is rich in nitrogenous compounds. No ammonia, as such, exists among its constituents; but the access of air and moisture induces a slow decomposition by which ammonia is generated, and when the circumstances are favorable it escapes into the atmosphere. Wherever moisture is abundant these changes are most rapidly affected; whereas, on the other hand, a dry climate and a rapid accumulation of the deposit are more likely to insure its preservation in a comparatively unchanged state."

From these remarks it is obvious that the composition, and consequently the value of the different kinds of guano, will vary according to age and the localities from which they are obtained. The varieties best known to commerce are the Peruvian, Bolivian, Chilian, Patagonian, Ecuadorian, Mexican, Central American, West Indian, and African, (Ichaboe and Saldanha Bay,) etc. They may also be classed in conformity with their chemical composition, or as follows:

Equadorian.....	} Ammoniacal.
Peruvian, (Chincha)	
Bolivian, (Angamos)	
Chilian, (fine).....	
Chilian, (ordinary) ..	} Intermediate.
Peruvian, (Lobos) ..	
Mexican	
West Indian.....	
Ichaboe.....	
Saldanha Bay	} Phosphatic.
Algoa Bay	
Patagonian.....	
Shark's Bay, (Aus.)	

Peruvian guano is found on the islands and coasts between the 6th and 21st degrees of south latitude. The government report of 1853 divides the huaneras or deposits into three grand sections: the *southern* embracing the coast from the limits of Bolivia to Arica; the *middle*, comprising those between Arica and

Callao; and finally, the *northern*, including the remainder between Callao and Paita.

The "southern section" bears the local names of Chipana, Huanillas, Punta de Lobos, Pabellon de Pica, Puerto Ingles, Iquique and Patillos, Punta Grande, etc. The *Chipana* deposit is situated in lat. $21^{\circ} 22'$ south, and consists of a table-rock from twenty-five to fifty yards above the sea. The *Huanillas* lies in lat. $21^{\circ} 18'$ south, and consists of four quebrados or valleys, in which are the deposits. The *Punta de Lobos* is a rocky point in lat. $21^{\circ} 06'$ south. The guano lies in the valleys in layers with a mean height of fifteen to twenty yards. The *Pabellon de Pica* is a tent-shaped hill near the village of Pica, in lat. $20^{\circ} 57'$. The guano of this deposit is found in crevices of varying depths. The guano of *Puerto Ingles*, about a quarter of a mile distant from the Pabellon, on a small peninsula, forms an eminence upwards of 500 yards long by 250 to 300 yards in breadth, on which are large huaneras. The islands of *Iquique* and *Patillos* lie to the north of the Pabellon and Puerto Ingles in lat. $20^{\circ} 46'$ south, the former in the bay of the same name. Both were important deposits in by-gone ages, but are now exhausted. The promontory in lat. $20^{\circ} 23'$ is called *Punta Grande*, and the guano is found in several valleys facing the sea. *Punta Grande* being in proximity to the Morro of Tarapaca, which is a kind of sand-hill, the guano in the deposit is covered with heavy layers of sand, and hence it is difficult to estimate its contents. These are said, however, to be immense; and there are many reasons also for believing that these deposits were used in the time of the Incas. Besides the deposits particularly noticed, there are smaller ones of white fresh guano upon different rocks and points between Iquique and Punta Grande, and at Pisagua—a small landing place to the north of the Punta, from which the manure is taken for the use of the coast region. There are also localities belonging to individuals. Probably the total amount of guano in the whole southern region, may be estimated at 10,000,000 tons, of which 7,921,407 tons have

been estimated for in the five first deposits, Chipana, Huanillas, Punta de Lobos, Pabellon de Pica and Puerto Ingles; and which are herewith recapitulated:

	Tons.
Chipana.....	280,602
Huanillas.....	1,912,505
Punta de Lobos.....	1,460,790
Pabellon de Pica.....	2,975,000
Puerto Ingles.....	1,292,510
Total.....	7,921,407

The "middle section" consists of the *Chincha Islands* in lat. $13^{\circ} 32'$ south, and nearly opposite to Pisco. Some guano is also found on the cliffs of Corredas and Viejos, and on the small island of Ballesta, but the quantity is small and not material to the estimate of the district. It is from these islands that the guano sent to foreign markets is chiefly extracted, and the quantity here accumulated is greater than in all the "huaneras" collectively. The quantity of manure on these islands has been variously estimated—in 1842 by Senor Jose Villa, in 1847 by Senor Rivero, and in 1853 by a government commission. The results of each estimate are herewith given:

	Estimate of Villa.	Estimate of Rivero.	Estimate of Government.
North Island ...	28,925,571	7,600,000	4,169,477
Middle Island ..	17,707,709	6,450,000	2,505,949
South Island ...		4,200,000	5,680,675
Total (tons) ..	46,632,280	18,250,000	12,376,100

An estimate by Admiral Moresby, (also in 1853,) reduces the amount to 8,600,000, of which 5,500,000 tons are attributed to the North Island, 1,500,000 tons to the Middle Island, and 1,600,000 tons to the South Island. Probably the estimate made by the government commission is nearest the truth. Taking this as the basis of calculation, and estimating the annual removal of the deposit at 300,000 tons, we arrive at the conclusion that the whole may be carried off in the next 41 years.

The "northern section" consists mostly of small islands, very low, and exposed to the winds. The layers of guano are not usually deep, and the deposits are frequently mixed with sand. They will eventually, however, become more valuable, as they are now the resort

of the vast clouds of birds which the operations at the Chincha group have driven northward; and thus, when the wealth of the one section is exhausted, the other will supply its place. The islands of this section may be divided into four groups, viz.: the Lobos de Tierra, the Lobos de Fuera, the Guanape, and the island of Ferrol. The *Lobos de Tierra* (5° 06' S.) group consists of a principal island, and the islands of Bermeja, Felix Gonzales and Colorado. The *Lobos de Fuera* is two islands lying in lat. 7° 03' S., and separated by a very narrow channel. The guano of this group is mixed with the excrements of the sea-lions, (*lobos*), which are here very numerous. The *Guanape Islands* are two in number, lying in lat. 8° 36' S., and about five miles from the coast. Only the northern island contains guano. The island of *Ferrol* is a small island in lat. 9° 07' S. The extent of the guano deposits on the islands of the northern section, as above defined, is shown by the following table:

Groups, etc.	Tons of guano.
Lobos de Tierra	477,858
Lobos de Fuera	265,743
Guanape Islands	79,800
Island of Ferrol	30,700
Total	854,101

Aggregating the sums of each of the three sections of the Peruvian deposits, the following will be the result:

Southern Section	7,921,407 tons.
Middle Section	12,376,100 "
Northern Section	854,101 "
Total	21,151,608 "

In addition to the deposits above enumerated, guano is also found in small quantities on the islands of Malabrigo (lat. 7° 49'), San Martin or Dona Maria (lat. 11° 04'), Mazorque (lat. 11° 25'), Pescadores (lat. 11° 46'), Las Hormigas (lat. 11° 56'), and El Pelado in lat. 11° 35' south. The island of Santa, in lat. 9° 11', contains only a few tons of recent guano; but it is probably destined to become an important deposit, since, of late years, its large area has become the resort of myriads of birds, and the guano is rapidly accumulating.

These guano deposits are of immense value

to Peru, and the sale thereof yields to the nation five-eighths of the public income. In 1857 the income amounted to \$8,656,256, of which \$5,296,952 were derived from this source. The quantity shipped during the years 1856-'57, and 1857-'58, and the destination of the material, is stated as follows:

Destination.	1857-'57.	1857-'58.
England and the Continent	181,134	151,333
Spain	7,874	27,160
France	14,101	25,545
Australia .....	.....	1,523
Mauritius .....	.....	7,228
United States	51,943	51,253
Barbadoes .....	.....	2,667
Asia	1,929	.....
Total (Peruvian tons) ..	256,981	266,709

Bolivian (or Angamos) guano is found in many spots along the coast bordering on the desert of Atacama. Pacquica is the principal port from which it is shipped. As a fertilizer it ranks next to the guano of the Chincha Islands, being the product of a region but a few degrees southward, and in which rain never falls. But the deposits are frequently buried in sand, and the guano oftentimes mixed or adulterated therewith. These circumstances add largely to the cost of shipping, and have tended greatly to depreciate its real value in the markets. The shipments have been wholly on British account, and up to 1858 had amounted only to 24,667 tons.

Chilian guano has been found chiefly in the vicinity of the desert of Atacama, on the northern frontier—is generally of a very inferior quality, and the deposits may be said to be nearly exhausted. There are, however, other deposits further south; and another and a very valuable variety, although rare, is exported from Valparaiso. This latter is said to be collected from the rocks, and is a recent deposit. It is quite hard, and comes to this country in large pale-yellowish masses, and in value is said to be equal to that of the best Peruvian. Between 1848 and 1858, both years inclusive, only 8,847 tons of Chilian guano have been imported into the United States.

Patagonian guano is inferior in value to that found on the coasts nearer the equator, inas-

much as the deposits have been deprived of their salts by the frequent rains of the climate. The guano of this region indeed is almost wanting in ammonia; and it is always mixed with sand, sometimes to the amount of one-third the unit. Very little, if any, of this deposit has been brought to the United States, and to 1858 only 73,485 tons had been landed in England.

Equadorian guano is brought from the Galapago Islands, which belong to the Republic of Equador. This group lies some six hundred miles west of the mainland, and consists of four considerable and a large number of smaller islands and islets. The shores abound in turtle, (hence the name, Galapagos,) and are frequented by myriads of aquatic fowls. From the latter the guano of these islands is derived. Of this deposit only 525 tons have reached the United States. It is, however, according to the analysis of Prof. Horsford, rich in ammonia, the sample examined by him having contained 15.59 per cent. of that substance; and hence it probably ranks with the average qualities of the Peruvian stock. The islands near the Equadorian coast, and also those near the coast of New Granada on both seas, contain deposits of this fertilizer of greater or less extent.

Mexico and Central America have deposits on the headlands and islands on both the east and west coasts. The locality will vary in the composition of the several varieties. In some parts of the Pacific coast, where the climate is nearly rainless, the deposits will be essentially ammoniacal. Where the rains are frequent and heavy, their value will depend on the amount of their phosphates. But as yet little is known of these brands. On the Pacific side the largest known deposits have been found on the three islands called the Marias. In the vast stretch of coast from the Isthmus of Darien to the head of the Gulf of California, however, there is ample space for future discovery. On the Atlantic side of these countries, the guano is of an entirely different character from that found on the Pacific coast, and in some instances has yielded as much as 60 per cent. of the phosphate of lime. The island group called the

Triangles, near the coast of Yucatan, is the chief known source of Mexican guano. Small shipments have been made annually into both England and the United States since 1851.

West Indian guano is found abundantly on the solitary rocks and islets which stud the Caribbean Sea, and the neighboring ocean. The island of Aves, or Bird Island, (the possession of which is now contested between the Venezuelan and Dutch governments,) is the richest source of phosphate guano hitherto discovered. Some samples have yielded 84 per cent. of dry super-phosphate of lime, or one-third more than pure ground bones. It is very remarkable for its little moisture. Of dry organic matter and ammonia, the proportion is $6\frac{1}{2}$ per cent. There are also workable deposits on Navasa island off the southwest peninsula of Hayti; and there are large deposits on the peninsula of Samana, and also on the Florida Keys. With the exception, however, of the Bird Island deposit, these have not been disturbed. The guano of this island is known to commerce as Venezuelan.

Western and Southern Africa have yielded large quantities of guano, which have been collected chiefly at two points, Saldanha Bay and Ichaboe. The guano of Saldanha Bay, like that of Patagonia, comes from a latitude and climate subject to heavy rains, and consequently loses the greatest part of its ammonia, unless collected in a very recent state. It derives its chief value from its phosphates, which range higher than those of any other known variety except those of Mexico and the West Indies. Ichaboe guano is now nearly exhausted, and where found in the markets is a recent deposit made from day to day, and collected by hand from the rocks. This new guano is much more valuable than the old, the latter having been exposed to the wind and rain of centuries, and lost nearly all its ammonia. It approaches in composition that of the Chincha Islands, but it is remarkable as containing a considerable percentage of carbonate of lime, which is entirely wanting in the Peruvian variety.

In the course of our remarks, we have incidentally referred to the composition of the sev-

eral varieties as ascertained by analysis. It may now be proper to compare the results, as on their composition depends their value. The analyses that appear in the following table will suffice for this purpose:

	(a) Dr. Thomas Anderson's analysis.		(b) Kensington Laboratories.		(c)
	Raymonde of Lima.				
China, (a)	13.73	Water.			
Lober, (c)	9.30	Organic Matter			
" (c)	22.00	and Am. Salts.			
" (c)	12.60	Phosphates.			
" (c)	16.50				
Bolivia, (a)	15.79				
Chilian, (a)	15.13				
" interior, (a)	6.06				
Patagonia, (a)	15.09				
Saldanha Bay, (a)	21.03				
" (b)	14.47				
" new, (a)	18.89				
	32.49				
	19.63				
	6.91	Alkaline Salts.			
	19.59				
	2.49				
	10.42				
	17.00	Proportion of			
	18.87	Ammonia.			
	4.26				
	6.42				
	19.71				
	18.80				
	2.11				
	2.69				
	1.62				
	0.47				
	8.50				
	10.42				

The great variation in the several guanos is thus made clearly apparent. But practically there are only two constituents which commerce recognizes as valuable—the ammonia and the phosphates. Knowing the cost of these materials in the market, we may therefrom easily deduce the money-value of any of the guanos severally. Thus, ammonia is worth about fifteen cents a pound, and the phosphates about two cents a pound. In China Island guano we find seventeen per cent. of the former, and 23.48 per cent. of the latter commodity.

Hence,
340 pounds of ammonia at 15 cents per lb.....\$51.00
470 " " phosphates at 2 " " 9.40
gives the value of a ton (2,000 lbs.) of China guano at \$60 40.

In the same manner we find the value of a ton of Saldanha Bay guano, (containing 1.62

per cent. of ammonia and 56.4 per cent. of phosphates,) to be \$28 42, thus—

32.4 pounds of ammonia at 15 cents per lb... \$4.86
1128.0 " " phosphates at 2 " " ... 23.56

Strictly speaking, however, the alkaline salts have some value, say a half a cent per pound, and this may be added according to the proportion present in the samples examined.

It may be proper here to see how far the theoretical prices agree with the actual market prices. In the Liverpool market of the 18th March, 1859, the quotations were as follows:

Peruvian (Chincha).....	£12 00s. to £12 10s.
" (Upper or Bolivian)...	7 10 to 8 00s.
Ichaboe	5 00 to 6 00s.
Patagonia	3 10 to 4 10s.
Saldanha Bay.....	5 10 to 6 10s.

and it may be stated that in the New York market, Peruvian guano brings from \$60 to \$65 per ton. These figures confirm essentially the correctness of the method of valuation adopted.

Hitherto, we have not alluded to the sources of guano in the Pacific Ocean. These are new, and comparatively unknown, and have mainly, if not altogether, been discovered by American explorers, who, under the stimulus of the act of Congress, passed 18th August, 1856, have organized expeditions to search for this valuable commodity.

The act alluded to was passed for the protection of those who risked their lives and fortunes in these adventures. It provides that, "when any citizen or citizens of the U. S. may have discovered, or shall hereafter discover, a deposit of guano on any island, rock or key, not within the lawful jurisdiction of any other government, and not occupied by the citizens of any other government, and shall take peaceable possession thereof, and occupy the same, said island, rock or key, may, at the discretion of the President of the U. S., be considered as appertaining to the United States." The discoverer must give notice to the State Department, noting the latitude and longitude of the island, rock or key discovered, and furnish satisfactory evidence of the date of discovery, and of the taking possession and occupation thereof, etc.

Congress alone can grant the *exclusive* right of occupation for the purpose of obtaining and of selling the guano to citizens of the United States; but "nothing in this act contained shall be construed obligatory on the United States to retain possession of the islands, rocks or keys aforesaid, after the guano shall have been removed from the same." The trade between the islands and the ports of the United States is to be considered as a branch of the coasting trade, and regulated as between different parts of the United States. The President is authorized, at his discretion, to employ the land and naval forces to protect the rights of discoverers; and, "until otherwise provided by law, all acts done, and offences or crimes committed on every such island, or in the waters adjacent thereto, shall be held and deemed to have been done or committed on the high seas, and be punished according to the laws of the United States.

The advantages of this law to the American merchant and navigator are apparent, and have been followed by a vast amount of exploration and discovery, both by individuals and associations. Up to the commencement of 1859, no less than forty-nine guano islands and island groups have been discovered in the Pacific Ocean, and taken possession of by Americans. These are named in the following list, (all notified to the State Department,) which also gives the astronomical position of each:

	Latitude.	Longitude.
Baker's	0° 15' S.	176° 21' W.
Jarvis'	0° 21' S.	159° 52' W.
Howland	0° 50' N.	176° 52' W.
Malden's	4° 15' S.	155° 00' W.
Arthur's	3° 32' S.	176° 05' W.
Christmas	1° 58' N.	157° 32' W.
Caroline	9° 54' S.	150° 07' W.
Ann's	9° 49' S.	151° 15' W.
Staver's	10° 05' S.	152° 16' W.
Flint's	11° 26' S.	151° 48' W.
Bauman's	11° 48' S.	154° 10' W.
Rogewein's	11° 00' S.	156° 07' W.
Gronique	10° 00' S.	156° 44' W.
Friehaven	10° 00' S.	156° 59' W.
Quiro's	10° 32' S.	170° 12' W.
Low	9° 33' S.	170° 38' W.
Clarence	9° 07' S.	171° 40' W.
Favorite	2° 50' S.	176° 40' W.
Duke of York	8° 30' S.	172° 10' W.
Farmer's	3° 00' S.	170° 50' W.

	Latitude.	Longitude.
Birnie's	3° 35' S.	171° 39' W.
Phenix	3° 40' S.	170° 52' W.
Mary's	2° 53' S.	172° 00' W.
Enderbury's	3° 08' S.	174° 14' W.
Sydney	4° 20' S.	171° 00' W.
Penhryn's	8° 55' S.	158° 07' W.
Pescado	10° 38' S.	159° 20' W.
Ganges	10° 59' S.	160° 55' W.
Rierson's	10° 10' S.	160° 53' W.
Sideron's	11° 05' S.	161° 50' W.
Humphrey's	10° 40' S.	160° 52' W.
Frances	9° 58' S.	161° 40' W.
Flint	10° 32' S.	162° 05' W.
Nassau	11° 32' S.	165° 30' W.
Danger	10° 00' S.	165° 56' W.
Mary Letitia's	4° 40' S.	173° 20' W.
Kennin's	4° 41' S.	173° 44' W.
Walker's	3° 58' N.	149° 10' W.
Sarah Anne	4° 00' N.	154° 22' W.
America	3° 40' N.	159° 28' W.
Prospect	4° 42' N.	161° 38' W.
Samarang	5° 10' N.	162° 20' W.
Palmyra	5° 48' N.	162° 20' W.
Danger	6° 30' N.	162° 32' W.
Makin	3° 02' N.	172° 46' W.
Mathew's	2° 05' N.	173° 26' W.
David's	0° 40' N.	170° 10' W.
Barber's	8° 54' N.	178° 00' W.

The two first-named islands have been claimed by the American Guano Company, and the rest by the United States' Guano Company, and individual citizens of the United States.

These acquisitions are all to be surveyed and charted, and the quality and quantity of the guano thereon, to be ascertained by competent analytical chemists and topographical engineers, and a report thereof made to Congress at the earliest practicable period. At some of these islands there are good harbors and safe anchorage, and at others of them there is a good lee; which conditions, coupled with the fact that generally they are situated where storms are seldom known (the prevailing winds being from the east), make them places of safe resort for ships.

The quantity and accessibility of the guano on many of these islands is placed beyond doubt. What remains to be demonstrated is its quality, and whether that is such as to warrant its importation. Generally the guano of the Pacific Isles is that classed as phosphatic, and contains also sulphate of lime and other salts. Little, however, has been brought into the Atlantic States. In 1857 some seventy or eighty tons were imported into New York in the ship

Aspasia; and yet, with such limited quantity, experiments have been made which have proved its value as a fertilizer; and its success has led to a demand which will insure an immediate and thorough trial of its powers.

The accounts of the operations of the companies and individuals operating in the Pacific are very meagre, and not at all connected. From the latest, which appear in the "N. Y. Tribune" of the 28th May, 1859, we learn that the American Guano Company (which has its Pacific headquarters at Honolulu, and its principal seat in New York) has been very successful at Jarvis' Island, and had already carried into Honolulu between 13,500 and 14,000 tons of guano. Considerable quantities had also been landed at San Francisco. The value of this guano in New York is about \$40 per ton.

From the brief survey of the localities of this material of commerce, which it has been the object of this paper to portray, it is evident that, in one form or other, guano is not that scarce article which our incomplete information would lead us to prejudice. It is found, indeed, in all the solitudes of the earth, and is daily being accumulated, and will ever be on the increase, so long as the sea-bird finds a home on the coasts and promontories, or on the islands of the great ocean. The demands of commerce and agriculture, be they ever so vast, cannot, therefore, exhaust the rich stores of nature. They may clear away existing deposits—laying bare the rocks which are now covered with the animal refuse of ages, but again and again, so provident is nature, and so prodigal in her gifts to man, will the bird return to its habitat, and renew, layer by layer, the so valued mass; and when driven away for a time, it but seeks another scene for its operations. In all this may we not trace the hand of a wise Providence, who thus has provided a panacea against the improvidence of man, and stored up a treasure that brings fertility and productiveness to the lands which, through ignorance and folly, he has converted into a wilderness, and rendered unfit for his habitation. R. S. F.

STATISTICS OF AMERICAN STATES.

NO. 6.

REPUBLIC OF URUGUAY.

Lat. 29° 20' to 34° 58' S. Populat'n (1856), 177,300.
Long. 52° 38' to 58° 31' W. Density, 2.41 to sq. mile.
Area, 73,538 sq. miles. Capital, MONTEVIDEO.

GOVERNMENT.

Executive.—President, elected for four years. The present President, Don Gabriel Antonio Pereira, was elected on the 1st March, 1856. The Vice-President (Don Bernardo P. Berro) is elected for the same term as the President.

Administration.—The Ministers—1st, of foreign relations and internal administration; 2d, of finance, and 3d, of war and marine.

Legislature.—A Senate and House of Representatives, the members of which are elected by the people.

Judiciary.—A Supreme Court at Montevideo, and courts of superior jurisdiction at Montevideo, Colonia and Maldonado.

Religion.—The Holy Apostolic Roman Catholic.

POPULATION IN DEPARTMENTS.

Departments.	1856.	1829.	Incr.
Montevideo	43,520	23,404	20,116
Guadalupe (Canelones) ..	13,600	7,800	5,800
San Jose	13,500		
Florida	9,400	8,080	13,820
Colonia del Sacramento ..	10,320	9,706	614
Soriano	13,200	13,200	....
Paysandu	11,200		
Salto	14,300	27,900	6,660
Tacuarembu	9,060		
Cerro Largo	10,100	10,100	....
Maldonado	12,600		
Minas	9,300	21,296	604
Durazno, or Entre Yi y			
Rio Negro	8,200	6,826	1,374
Total	177,300	128,312	48,988

Chief Towns.—Montevideo, Colonia and Maldonado. Montevideo has about 35,000 inhabitants. Besides these, there are 15 smaller towns, and 8 pueblos.

FINANCES (1856).

Receipts	\$2,132,800	Deficit.
Expenditures	3,280,745	\$1,147,945
Public Debt (1853)	about \$10,000,000	

COMMERCE (1855-'56).

1.—Value of Exports and Imports.

Years.	Imports.	Exports.	Total.
1855	\$4,504,987	\$8,791,249	\$13,296,236
1856	4,586,317	10,303,853	14,890,170
Increase.	\$81,330	\$1,512,604	\$1,593,934

2.—Domestic Produce Exported 1852-55.

Products.	1852.	1853.	1854.	1855.
Seal oil Casks,	...	53	104	94
Ox horns... 1,000 ds.	659	773	571	542
Bones 1,000 ds.	420	889	241	442
Beef qqtls.	20,420	37,444	43,780	62,774
Ashes tons,	940	940	4,355	6,968
Hair 25 lbs.	28,980	76,810	58,210	34,290
Cow hides, dry .. No.	479,496	650,179	325,522	269,261
" salt..	113,563	111,831	106,545	113,654
Horse hides, dry ..	86,970	191,456	114,993	96,442
" salt..	26,926	102,250	71,250	82,314
Hides, slunk.....	7,256	8,854	2,920	3,317
Skins, seal.....	12,875	9,109	3,450	6,596
" hog.....	86	908	...	326
" ass.....	128	95	304	200
" deer doz.	...	...	...	2
" sheep.....	1,350	14,261	9,808	6,094
" otter.....	90	1,170	330	145
" goat.....	200	1,250	30	...
Beasts' claws ...	111,500	146,600	87,500	112,556
Grease qqtls.	1,866	1,631	930	1,394
Wool 25 lbs.	59,620	183,150	51,010	48,080
Mules and mares. No.	315	1,095	1,569	3,022
Hoofs 1,000 ds.	85	233	61	45
Feathers lbs.	7,500	23,000	5,100	4,500

3.—Distribution of Principal Exports, 1855.

Staple Products.	Brazil and Havana.	Bolivia.	Spain.	United States.	France.	Great Britain.	Genoa and Marseilles.
Horses..... 1,000 ds.	...	73	...	23	141	169	125
Bones.....	...	412	...	30	30	850	2,260
Hides, dry cow .. No.	1,008	27,022	52,654	30,301	86,907	1,462	60,907
" dry horse.....	569	18,141	7,500	2,275	29,207	55,039	11,630
" salted horse.....	...	6,798	6,348	2,064	43,064	553	25,183
Beasts' claws.....	...	1,050	5,500	5,000	22,190	160	1,854
Grease.....	45,206	1,050	5,500	5,000	86,856	35,160	10,450
Wool..... 25 lbs.	14,170	...	...	...	7,540	13,150	4,130
Feathers..... lbs.	...	...	...	...	10,630	6	40

A.—Distribution of Imports in 1855.

Country.	Wines and Spirits.	Provisions.	Manufactures, etc.	Total.
England.....	\$35,200	\$8,200	\$804,400	\$847,800
France.....	83,600	16,800	632,800	733,200
Spain.....	358,000	31,000	159,800	548,800
Brazil.....	135,400	76,800	161,800	374,000
U. States.....	10,000	15,000	246,600	273,500
States of Italy.....	35,200	16,500	120,600	175,600
La Plata (Buenos Ayres) ..	2,800	...	163,400	166,200
Other countries.....	149,400	66,600	950,200	1,166,200

Total \$334,200 \$431,200 \$3,239,600 \$4,505,000

5.—Navigation, (1855).

Arrivals.....	1,593 vessels.	183,779 tons.
Departures.....	1,514 "	187,570 "

6.—Distribution of Shipping (1855).

Countries.	Arr. and Dept.	Tons.
Great Britain.....	200 vessels.	59,186
France.....	179 "	50,097
United States.....	145 "	44,855
Spain.....	194 "	36,010
Sardinia.....	169 "	34,840
Brazil.....	100 "	20,236
Hamburg.....	66 "	16,016
Buenos-Ayres.....	158 "	12,852
Other foreign countries.....	415 "	41,006

Total foreign.....	1,626 "	315,098
In coasting trade.....	1,481 "	56,251

Total 3,107 " 371,349

7.—Commerce with United States.

(From the Report of the Register of the Treasury.)

Years.	Exports from U.S.	Imports into U.S.	Shipping Entered.	Cleared.
1849.....	\$147,727	\$79,924	1,609 tons.	4,980 tons.
1850.....	61,542	...	1,275 "	2,034 "
1851.....	45,789	19,114	2,146 "	2,267 "
1852.....	193,073	49,707	2,508 "	6,443 "
1853.....	308,446	302,980	3,660 "	10,056 "
1854.....	512,957	457,179	3,980 "	19,643 "
1855.....	422,172	242,709	6,317 "	19,721 "
1856.....	551,329	361,036	2,056 "	13,319 "
1857.....	1,006,172	368,297	2,530 "	24,439 "
1858.....	578,128	621,888	4,705 "	14,544 "

WEIGHTS, MEASURES AND MONEYS.

Old—The system of Spain.

New—The French metrical system.

The English yard and gallon are also in use at Montevideo. [R. S. F.]

HUMBOLDT COMMEMORATION.

A special meeting of the "American Geographical and Statistical Society," in commemoration of their most illustrious fellow member, the late Baron Humboldt, will be held on Thursday evening, June 3d. Professors Lieber, Bache and Guyot will deliver addresses.

ELEMENTARY STATISTICS OF EUROPEAN STATES.

No. 3.

PUBLIC FINANCE: RECEIPTS, EXPENDITURES, DEBTS, Etc.

States, etc.	Date of Return.	Aggregate Receipts into the Treasury.	Public debt	Expenditures on account of— Army and Navy.	Total, inc. all others.	Amount of Public Debt.	Normal unit, & rate of conversion
Andorre	—	50,000	.....	.....	50,000	.....	.....
Anhalt-Bernburg.....	1858	795,960	.....	.....	795,960	2,035,624	thaler=0.72
Anh.-Dessau-Koethen ..	"	1,212,836	.....	.....	1,212,836	1,705,773	"=0.72
Austrian Empire.....	1857	149,147,923	45,893,498	53,445,009	170,414,858	1,208,000,000	florin=0.50
Baden*.....	1858	6,693,294	.....	.....	6,623,643	38,580,688	"=0.41
Bavaria*.....	1856	16,234,940	5,214,913	3,721,119	16,972,713	84,630,422	"=0.41
Bremen.....	1858	26,887,052	7,187,805	6,291,280	26,033,054	131,785,475	franc=0.19
Brunswick*.....	"	1,051,037	208,291	120,925	1,095,925	6,791,700	thaler=0.80
Denmark.....	"	3,379,320	.....	.....	3,379,320	6,935,325	"=0.72
Frankfurt*.....	"	9,242,358	3,321,972	3,481,383	9,201,858	62,136,720	"=0.54
Frankfurt*.....	"	1,030,150	274,874	221,512	979,491	7,030,250	florin=0.50
French Empire.....	"	337,044,632	100,787,002	112,972,206	335,674,382	1,526,078,568	franc=0.19
Great Britain, etc.....	"	325,831,262	137,410,085	151,224,749	337,818,523	3,740,280,000	£ stg.=4.80
Greece.....	1857	3,106,802	272,921	1,122,369	3,050,879	19,125,000	drachm=0.17
Hamburg.....	1858	2,024,229	.....	.....	2,153,366	22,656,767	mark=0.29
Hanover*.....	"	13,758,182	1,506,327	1,863,720	13,826,354	33,273,579	thaler=0.72
Hesse-Cassel*.....	"	3,585,082	330,235	810,526	3,602,628	8,135,244	"=0.72
Hesse-Darmstadt*.....	"	3,511,963	.....	.....	3,479,872	7,548,797	florin=0.41
Hesse-Homburg*.....	"	154,917	.....	.....	177,265	434,071	"=0.41
Holland (Luxemb'g*).....	"	30,399,119	13,601,379	4,727,218	29,089,358	463,851,544	"=0.41
Ionian Islands.....	1856	1,830,917	10,766	120,000	1,736,605	1,440,000	£ stg.=4.80
Lichtenstein.....	—	29,700	.....	.....	29,700	.....	florin=0.54
Lippe-Detmold.....	—	324,000	.....	.....	324,000	252,000	thaler=0.72
Lubeck.....	1858	301,780	107,800	30,320	301,280	2,490,200	marc=0.28
Mech'g-Schwerin }.....	54	1,580,519	.....	.....	1,646,413	3,697,581	florin=0.48
Mech'g-Strelitz }.....	"	.....	.....	.....	.....	.....	.....
Modena.....	1851	1,598,588	.....	.....	1,658,345	.....	lira=0.19
Monaco.....	—	20,000	.....	.....	20,000	.....	.....
Nassau*.....	1858	2,318,521	.....	.....	2,318,521	3,790,000	florin=0.50
Oldenb'g & Kuiph'en.....	"	1,827,345	.....	.....	1,825,229	2,724,480	thaler=0.72
Parma*.....	"	1,844,140	.....	.....	1,844,140	2,257,200	lira=0.19
Portugal.....	"	74,403,961	3,896,580	4,504,388	15,277,533	118,432,256	milrea=1.18
Prussia*.....	"	91,015,040	9,503,892	22,771,776	91,015,040	176,268,286	thaler=0.72
Reuss-Greiz.....	—	43,750	.....	.....	43,750	.....	"=0.72
Reuss-Schleitz.....	—	189,360	.....	.....	187,200	352,080	"=0.72
Roman States.....	1858	15,541,813	4,805,078	2,146,757	15,391,223	70,459,550	scudo=1.06
Russian Empire.....	1852	220,377,600	26,800,000	77,916,000	220,668,000	1,043,414,123†	S. rouble=0.80
San Marino.....	—	6,360	.....	.....	4,240	.....	scudo=1.06
Sardinia.....	1858	27,546,679	9,488,050	7,275,614	28,262,035	128,633,843	franc=0.19
Saxe-Altenburg*.....	"	534,773	.....	.....	532,659	787,122	thaler=0.72
Saxe-Coburg-Gotha*.....	"	416,880	.....	.....	416,880	1,611,693	"=0.72
Saxe-Meiningen*.....	"	674,122	.....	.....	664,169	1,721,764	florin=0.41
S-Weimar-Eisen'ch*.....	"	1,116,595	201,189	26,413	1,111,854	4,055,169	thaler=0.72
Saxony*.....	"	6,742,975	326,001	1,421,869	6,636,896	44,153,289	"=0.72
Schaumb'rg-Lippe*.....	—	164,160	.....	.....	164,160	.....	"=0.72
Schwartzb'g-R'd't 1858	—	330,374	.....	.....	327,562	.....	florin=0.41
Schwartz'g-Sond.....	—	384,802	.....	.....	379,811	1,116,015	thaler=0.72
Spain.....	"	99,207,774	12,057,978	22,253,607	99,207,774	732,205,548	real=0.05
Sweden.....	"	7,412,916	.....	3,339,950	7,142,838	.....	R. M. thaler=0.28
Norway.....	"	5,185,040	276,090	1,674,400	5,185,040	4,910,416	Sp. thaler=0.12
Switzerland (fed.) 1857	—	3,721,091	60,737	272,382	3,050,664	1,937,698	franc=0.19
Turkey*.....	1854	34,602,000	.....	14,673,000	34,602,000	548,559,200	piastre=4.38
Tuscany.....	1858	6,219,216	.....	1,328,268	6,218,944	.....	lira=0.16
Two Sicilies.....	1856	26,249,886	.....	.....	26,518,191	101,153,760	ducat=0.83
Waldeck.....	1857	267,527	.....	.....	278,524	.....	thaler=0.72
Wurtemberg*.....	1858	6,920,538	.....	.....	6,918,591	21,988,133	florin=0.41

* Custom's Revenue of the Zollverein States, 1857:—Prussia, \$12,017,376; Luxemburg, \$64,944; Bavaria, \$750,408; Saxony, \$1,900,080; Hanover with Schaumburg Lippe, \$1,533,616; Wurtemberg, \$292,679; Baden, \$602,332; Hesse-Darmstadt, \$204,048; Hesse-Cassel, \$408,240; Thuringian States, \$232,776; Brunswick, \$205,992; Oldenburg, \$186,768; Nassau, \$47,169; Frankfurt, \$656,856. Total, \$19,153,512.

† Debt as returned in 1858.

[R. S. F.]

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